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The Physiotherapy Review

Vol. XI No. 3

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Neuritis—As Seen by an Orthopedic Surgeon

A synopsis of a talk given before the Massachusetts Chapter of the American Physiotherapy Association at Boston

An orthopedic surgeon is very apt to see many cases for diagnosis and treatment which are labelled neuritis. Of course the term is used very loosely and very freely by the laity and covers a multitude of sins, generally a convenient name to call something. My remarks tonight are essentially an attempt to put together my clinical experience in matters of diagnosis, to try to summarize the trend of thought in regard to the so-called peripheral neuritides, based chiefly on clinical work and reading rather than any research.

I remember reading a comparatively short time ago a statement of Dr. Patrick's of Chicago, an eminent neurologist, in which he was discussing this question of neuritis of the arm, and it was somewhat to the effect that most of his cases that came in with a diagnosis of neuritis were sure to be a subdeltoid bursitis. I cannot lay my hand on his real statement, but this was the gist of it. Of course this is at the present time a well-known fact, but before Codman began to call attention to this condition about twenty years ago, I am afraid that many of the cases were labelled neuritis. I am sorry to say that it still occurs and what ought to be a rather easy condition to diagnose is still called neuritis, just because the pain goes down the arm.

Let us go back a little to what was commonly thought to be the pathology of peripheral neuritis. I have just been reading a standard text book on internal medicine, published in 1927, which gives me the idea that the pathology of neuritis is of two types; first, that there is an inflammatory process of the nerve sheath, that the nerve involved, say the sciatic, is thickened and tender to touch, a true infectious process of the sheath. The second type that is described is of the degenerative type where there is change in the substance of the nerve, loss of nerve structure, and microscopically loss of nerve cells, degeneration into fibrous tissue. This, in general, was what I was taught as the pathological picture of cases of so-called neuritis. This whole conception then was that the lesion was essentially in the peripheral nerves, either inflammatory or degenerative, the latter often being the explanation in cases of lead poisoning and alcoholic poisoning.

I have always been doubtful of the pathological evidence of the first group, the inflammatory changes of the nerve sheath. I never saw any reference to pathologic studies showing this, and have rather assumed that this was a description that was handed down without proof. It was on this assumption that the so-called nerve stretching in cases of sciatica was

done and even reports of cutting down on the sciatic nerve and slitting the sheath to relieve pain and alcohol injections into the sheath was done. Of course, the last simply temporarily stopped the induction of sensation along that nerve and thus relieved pain. The idea of nerve stretching was simply manipulation of the lower portion of the spine and its effect was not directly on the nerve.

It is true that this text book in its chapter on neuritis puts more emphasis on neuritis that is secondary to some pathology near the nerve roots, or in the cord, and makes definite mention of pressure neuritis, but it does still give the impression that the inflammatory process was in the nerve sheath, the same conception that is in our minds. I have my copy of Osler which I bought when I was studying medicine in 1903 and was very much interested in reading his chapters on neuritis. Sciatica was labelled a disease entity; the pathology was very similar to what I have roughly outlined; the neuritis of diabetes was called a toxic neuritis; the multiple neuritis of beriberi is described under the section of infectious diseases; the toe-drop, or paralysis of the anterior group of muscles, that occasionaly comes in such a long and wasting infection of typhoid fever, not seen very much now-a-days, is described as an infectious polyneuritis.

About twenty years ago at a meeting of the American Medical Association, I reported fifty consecutive cases of sciatica and analysed the diagnoses of these cases to show that in every case there was a lesion at or near the nerve origin, either a spinal lesion or pressure on the nerve root at its origin, such as malignancy in the pelvis. At that time the diagnosis of essential sciatica was very common, meaning an inflammation of the nerve sheath. The discussion of that paper was to show that a good many believed that sciatica was an entity and represented an inflammation of the nerve sheaths. There has been a general trend away from this idea, and now we always look for an explanation of the nerve pain and think of it as a referred pain.

As orthopedic surgeons, our interest has been very much absorbed in all sorts of back conditions. Much work has been done in studying the distribution of referred nerve pain, especially in the relation of the sacro-iliac joint and the lumbo-sacral joint, and their differentiation in diagnosis. The current literature is full of these articles and there is always a discussion at our meetings on these points. What I want to call your attention to is that now they all accept sciatic pain as a symptom and then work back to the cause and the interest lies only in the cause. There is no question but that this change in viewpoint has come within the last twenty years.

There is another group of cases that is seen by the orthopedic man which is very likely to be labelled neuritis of the arm. Occasionally they are very acute, but more often sub-acute, which evidently are due to an arthritis (in its broadest sense) of the cervical spine. I have seen them so acute that there is very little sleep and a good deal of actual pain. They will complain of pain down one arm, the same as the bursitis cases do, and pain on motion and use of the arm. Sometimes there is tenderness of the brachial plexus.

A routine method of examination of a case complaining of pain in the arm that might be called neuritic pain is, first, to examine the elbow joint, then the shoulder joint, especially for bursitis, and third, always the motions of the cervical spine. In the last group of cases we find that there is limitation of motion of the cervical spine and pain on motion which is referred along the nerve trunks, just as there would be in low-back conditions. Clinically, these cases of acute arthritis of the cervical spine may be very severe as regards the acute symptoms, and it is always the referred pain along the nerve trunks that is the unbearable part, exactly similar to sciatic pain. These cases will vary in intensity from the real acute ones to those which present low grade symptoms of dragging pain, which come on with fatigue, which has to do with poor posture.

The treatment of this so-called neuritis from acute arthritis of the cervical spine is based on the same principles of treatment of sciatic pain from low lumbar spine lesions. If it is secondary to hypertrophic arthritis of the cervical spine, not an uncommon condition in older people, then rest and fixation is best obtained by the use of the Thomas collar. This same fixation is definitely indicated in an acute cervical arthritis. In addition, putting the arm in a sling and lifting the weight of the arm from the neck to stop the drag on the cervical plexus, will be of definite help. In addition, heat and medication are called for.

It may seem foolish that the so-called tennis elbow, a localized tenderness at the attachment of the supinator group of muscles at the external condyle of the humerus, should be called neuritic, but it is very common for this condition to be undiagnosed. Of course the common symptoms are that they cannot grasp a tennis racket or golf club on account of sharp pain which is considered to be neuritis. The classical signs are very localized tenderness just above the external condyle with pain on gripping of the hand, especially in extension. I have often wondered why this condition was not more often seen in industrial problems, and only occasionally have I caught this type of case, then only when some one could not explain a disability. Of course we meet it among golfers, and tennis and baseball players.

It does not seem reasonable now that subdeltoid bursitis or any other shoulder joint lesion should be called neuritis, but of course, it is common knowledge that quite a percentage of cases are so called, simply because the pain extends down the arm. Tenderness over the bursa, limitation of abduction and rotation does not suggest neuritis. I have a very strong feeling that we are all apt to be a little superficial towards this condition of bursitis. It is possible that confining my work to a specialty has given me a different point of view; it is possible that I am apt to see the cases that do not do well; but when it is a common occurrence to have shoulders that are so tied up that under the best of treatment there is a disability of two or three months, I do not think we should be so superficial as to consider it a minor lesion. I think I would rather take care of a fractured neck of the humerus to regain motion than to accomplish the same in a case of subdeltoid bursitis that is adherent and shows no motion. The industrial surgeon knows its importance, because he knows that he cannot get a patient back to work without knowing the end result. There is too much neuritis ending in a stiff shoulder.

For some years as an orthopedic surgeon at the Deaconess Hospital in Boston, I have had the opportunity of seeing the problems connected with the large diabetic clinic. As you know, there is a condition occurring in diabetes that has been called diabetic neuritis and my interest has been in a study of these cases. As soon as I began to collect and study these

cases, I found that it involved such a problem in internal medicine that Dr. Howard Root of Joslin's clinic cooperated with me in this study and we published our results in the New England Journal of Medicine, May 1930, under the title of "Diabetic Neuritis with Paralysis." We were able to study eleven cases which were treated during the course of one year.

In looking at Dr. Joslin's book on diabetes, published in 1926, he mentions the fact that true neuritis is very rare, that the so-called sciatica is a condition that is benefited by orthopedic help, meaning that there is some back condition, such as arthritis of the spine, or poor muscle tone as a result of loss of weight. In the edition of 1928 he mentions the fact that primary neuritis in diabetes is usually a misnomer. Dr. Root has classified the cases that show definite pain in the legs and puts them into four groups as follows: Group I. Abnormal nutrition, meaning those cases that show a great loss of weight with pain; Group II. Neuritis; Group III. Referred pain from spine; Group IV. Deficient blood supply, arteriosclerosis. We both feel that possibly the first two groups might be essentially the same process, with the neuritis cases more marked.

This group of cases which were studied were of sufficient severity that they showed definite evidence of paralysis of some group of muscles. It is a common clinical picture to meet cases that are of milder type, that show no paralysis, that do show nerve pain, that correspond to a clinical picture of neuritis. A rough picture of a well marked case showed difficulty in walking on account of weakness of a group of muscles, such as the quadriceps or the anterior muscles of the foot, pain extending from the back down the leg, generally more on one side than the other, and loss of knee-jerk on the side most involved.

I believe it was considered that this was a peripheral neuritis, a toxic neuritis, a lesion of the peripheral nerve. As I described the physical findings in such a case, is it not suggestive of the same findings of an anterior poliomyelitis if we can leave out the onset of symptoms?

Now when we study these cases we find that they occur in those that are not under good diabetic care, in those that have a severe case of diabetes and cannot obtain sufficient food intake to balance the output. We have only one autopsy record of such a case, not of this series, but in a case that died of pneumonia while she showed clinically marked paralysis from peripheral neuritis. The essential findings of the spinal cord showed a degenerative process of the dorsal column. This is the only pathological study that we have of a case which showed definite paralysis from neuritis. It would be rare and a coincidence for such a case to die and it would have to be on account of some complication or acute process such as pneumonia. But the pathological findings in this case are very suggestive, in that there was a definite change in the spinal cord of the degenerative type rather than the inflammatory. Wottman and Wilder of the Mayo Clinic have reported somewhat similar observations as regards the type of cases that showed neuritis and have reported degenerative changes in the cord and nerve roots.

This brings us to the question of treatment of these cases. Undoubtedly the first principle of treatment is to have these under the best of medical care for their diabetes. Then those cases that show definite weakness and paralysis of muscles should be treated on the same principles as we use in infantile paralysis. It may be necessary to use temporarily some form of brace, such as a toe-drop brace for the foot. Generally, this can be discarded early because they show quite rapid recovery under proper treatment.

Heat in the form of baking is very important. It should be applied not only to the legs, but also to the back, taking into consideration the pathology of these cases. The pain at night is very common in these cases. They often will walk around at night because of the pain. Heat applied just before retiring will often help the night pain. Hot baths, if not too debilitating, are of value.

Massage should be very carefully given. In the acute stages only very light massage is of use. Then when the sensitiveness begins to leave, attention should be directed to careful re-education of the muscles, without fatigue, as we do in infantile cases. It is a very interesting study to see the muscle tone gradually come back in well cared for cases.

Attention should be paid to the proper support of the weakened abdominal muscles. Proper corseting and even supports are of advantage. Remember that these cases have often lost fifty pounds in weight and with this loss of weight there is always loss of muscle tone. Diabetics need exercise, a well-known medical fact, and this must be regulated by their ability to use their muscles properly.

Physiotherapy has a very important place in the treatment of these cases, but only when the underlying principles of pathology are recognized. The prognosis in these cases is very definitely good. Very seldom is the damage so great that recovery will not take place, so that now we do not hesitate to be optimistic about the progress towards recovery.

What I am suggesting in this talk before a group of physiotherapists is that we must be more careful about using the word neuritis, that it should be considered to be a symptom rather than a disease. There is certainly a growing tendency towards considering it in this manner. I have outlined to you, as an orthopedic surgeon, some of the problems that I see in practice.

Acute Myofibrositis—Discussion of Its Phenomena

By Jerome H. Samuel, M.D.

In a previous article* a discussion of the causes of Myofibrostis was presented. It is of interest to determine the reasons for the various signs and symptoms which are characteristic of this common affection.

To comprehend the various phenomena which attend an occurrence of acute Myofibrositis it is essential to delve into the anatomy, histology, and physiology of skletal muscle.

ANATOMY

Skeletal or cross-striated or voluntary muscles comprise almost 45% of the total body weight. They are mesodermal in origin. They are those tissues of the mammaliam body which are noted for their power of contractility to bring about movement or locomotion.

Muscles are individual organs, elongated in form, and consisting of aggregations of bundles of fibres grouped into fasciculi surrounded by a delicate sheath of connective tissue.

They have a point of origin and a point of attachment. The former is usually composed of dense connective tissue and the latter of a modified type of connective tissue, the tendon.

Fasciae connect the various muscles and unite them into groups. They are broad sheets of connective tissue which form a general interstitial connective tissue network that traverses all parts of the body. The deep fasciae dip down between the various muscles to enclose them in envelopes.

There are several classifications of muscles, but for the purpose of this article, one based upon kinetics will be employed.

To carry out any movement muscles work in combination. There is usually no power to either leave out a muscle from this combination or to add one to it. Four groups may be recognized:

A. Prime Movers: These are the muscles which are the chief moving force

B. Synergists: These are the muscles which inhibit movements not required.

C. Fixation Muscles: These are the muscles which inhibit movements not required.

C. Fixation Muscles: These are the muscles which fix the necessary portion of the body in the accomplishment of the movement and prevent disturbances in equilibrum. There are two types:

I. Those which are essential to the movement in all postures and which are not influenced by body movement.

II. Those which act only to prevent the equilibrium of the trunk from being disturbed by the movement.

D. Antagonists: These are the muscles which produce the movement which is diametrically opposite to that of the prime movers.

HISTOLOGY

Each muscle is a separate organ with its own blood, nerve, and lymph supply.

The entire muscle is enclosed in a sheet of areolar tissue—the epimysium. This dips into the substance of the muscle, dividing it into bundles or fasciculi, enclosing them in a delicate web—the perimysium. This dips into each bundle of muscle fibers separating each fiber from the other by a delicate connective tissue—the endomysium, which serves to support the blood vessels and nerves ramifying between them.

The muscle fiber is the histological unit of voluntary muscle. It is the contractile element which by its shortening brings about decrease of the entire muscle and exertion of its force. Each fiber is a multinucleated, cylindrical cell invested in a sheath—the sarcolemma, which encloses a sarcous substance composed of sarcoplasm and highly specialized contractile fibrillae noted for their cross-striations. The fibrillae are separated into Cohnheim's fields by invaginations of the sarcolemma.

The blood vessels of striped muscle are numerous. The large arteries with accompanying veins penetrate the muscle along the septal extensions of the epimysium and divide into smaller branches which run between the fasciculi. They further subdivide into twigs which pass between the finer bundles to ultimately break into capillaries that enclose the individual fibers in long, narrow rectangular meshes which run across or encircle the individual fibers. Since they are subject to the action of the contraction and relaxation of the fibers, their circulation is aided.

The nerves supplying striped muscle are both motor and sensory. The former are efferent and terminate in special aborizations, the motor end-plates, which lie beneath the sarcolemma upon the sarcous substance. There is one plate for each fiber. The latter are afferent and present two types. The first consists of neuromuscular spindles of Kolliker. These lie in the interstitial tissues between the fasciculi. They are encapsulated affairs enclosing three to ten to twenty slightly modified striped muscle fibers, medullated nerves, blood vessels, and interspersed connective tissue. Just beneath the capsule is a lymph space. Each spindle receives several medullated nerve fibers which penetrate the sheath, lose their covering, and after winding about the muscle fibers, break up into a network. The second consists of neurotendinous endings or Organs of Golgi. These lie in the interfascicular connective tissue and are usually found in the vicinity of the junction of the muscle and the tendon. They also are encapsulated affairs with 8-20 intrafusal tendon fasciculi invested in a fibrous sheath between which and the capsule is a lymph space. One or more nerve fibers perforate the side of the capsule and lose their medullary sheaths. The axis cylinders subdivide to end between the tendon fibers in irregular discs or varicosities.

*Myofibrositis—Discussion of its Causes by Dr. Samuel appeared in the PHYSIOTHERAPY REVIEW for May-June, 1930.

It is apparent then, that muscles and tendons are richly supplied with sensory nerve endings. They carry proprioceptive impulses of muscle and tendon sense.

The lymphatics of striated muscular tissue are represented by interfascicular clefts which extend within the connective tissue between the muscle fibers forming channels within the septa and they pass to the sheaths of the muscles and tendons as larger channels to carry off the lymph.

PHYSIOLOGY

Contraction is the prime function of muscular tissue. Stimuli coming through the efferent nerves cause shortening of the fibers. A tetanic contraction, which is the type occurring in normal muscle action, consists of about 50 fused twitches responding to 50 stimuli per second. As a rule, an entire muscle does not contract simultaneously but begins to do so at the motor end-plates and spreads in both directions at a propogation rate of 4-6 meters per second. There is an "all or none" law for each fiber—either it responds to a stimulus or it remains inactive. A minimal contraction is one in which some of the fibers of the entire muscle act. A maximal contraction is one in which all the fibers contract.

Extensibility is another important property of muscle tissue. A contractive muscle is more extensible than one that rests.

Muscle tone is that state of slight sustained contraction found in all skeletal muscles. It is lost in muscles involved in acute anterior poliomyelitis and increased in spastic paraplegia.

This tonicity depends upon the integrity of the reflex arc which is associated with muscles. There is a constant afferent flow of proprioceptive sensations of tension and pressure from the muscles, tendons, ligaments, and fasciae beginning in the neuromuscular and neurotendinous spindles, and of exteroceptive sensations of touch, temperature, etc., from the cutaneous and subcutaneous nerve endings. These impulses go to the spinal cord alone or to the spinal cord and cerebrum to ultimately return by way of the efferent nerves to the motor end-plates and muscle fibres.

Fatigue is that state of a muscle in which repeated stimulation causes prolonged length of contraction and incomplete relaxation. In the process of muscle metabolism sarcolactic acid is produced. Recovery from fatigue is hastened by an increased flow of blood which will remove sarcolactic acid and replenish glucose.

Under normal conditions muscles and tendons enter the human consciousness very little. When they become acutely inflammed, however, they oftentime usurp a major portion of the attention.

PHENOMENA

An attack of acute Myofibrositis in the neck, shoulder, back, gluteal region, is characterized subjectively by a fulminating onset after some trivial muscular effort or forced attitude entailing strain on the muscles which become affected. Pain, which is exquisite and spasmodic in character disappearing if complete relaxation of the part can be secured but reappearing with some slight change or variation in posture brought about either actively or passively. The synergists and antagonists of the affected muscles or muscles correspondingly suffer.

Objectively by alteration in tone whereby the muscles pass into a peculiar state of spasmodic contraction or hypertonus thereby tending to immobilise the part. Increase in volume whereby the muscles become swollen and in severe instances the overlying skin becomes tense, shining and edematous, pitting easily with pressure. Local rise in temperature whereby the skin covering the affected part feels distinctly warmer to the hand than that covering the corresponding healthy muscles of the opposite side.

The course is brief, usually not exceeding 8-10 days. Although reading can be profuse on this subject, one gains much by experiencing an attack himself.

PATHOLOGY

Acute Myofibrositis is an acute inflammatory involvement of one or more muscles. On microscopic section there is seen hyperemia and dilatation of the small blood vessels and capillaries; a migration of leucocytes into the muscle bundles and between the individual fibres; a proliferation of the nuclei of the interstitial connective tissues; a greater or lesser degree of compression of the muscle bundles and fibres; and if the process is severe, the muscle fibres show beginning degenerations. There is similar involvement of the vessels, nerves, and sensory nerve endings in the interfascicular supporting tissue.

EXPLANATION OF PHENOMENA

I. Hypertonus.—Altered tone is the fundamental physiological change which takes place in these muscles—there is a state of excessive irritability hypertonus. They over-respond to normal excitants in a painful manner which persists after the irritant has ceased to act.

A. Intensity of Response. In health during the contraction or extension of muscles proprioceptive afferent impulses are being carried to the related spinal centers, a certain proportion of which pass to the cortex to arouse states of consciousness only in so far as it is necessary to bring about voluntary movement. The major portion of volitional movement is subconsciously regulated. When muscles are in a "cramp" we become painfully aware of them for a short period of time. When muscles are inflammed a very large proportion of these stimuli reach the cortex, giving rise to sensations of pain.

B. Influence of Passive Movements. Any attempt to move these muscles causes an immediate secondary contraction by changing tension in them and sending a charge of proprioceptive impressions to the cortex. This is further enhanced by the almost instinctive contraction of muscles to prevent any such procedure.

C. Influence of Synergic Action. Complicated movements are executed through the harmonious coordination of muscles. Hypertonicity with attendant pain, excessive response, and incomplete relaxation interferes with this mechanism to bring about incoordination of movements.

D. Influence of Antagonistic Action. When one set of muscles contracts, its opponents relax. This elongation stimulates the sensorial nerve endings of the muscle to abolish its tone. In acute Myofibrositis, however, the spindles, lying in the intramuscular fibrous tissue become ultrasensitive probably because they are situated in an inflamed area, and the response to excitation is correspondingly excessive and painful. Normal inhibition does not occur. Thus, for example, when the extensors of the neck are inflamed, they do not normally relax and elongate when the flexors act, but give rise to a sudden painful check.

E. Influence of Exercise. During the acute stages exercise is difficult or impossible. Because of the hypertonus there is mechanical obstruction to normal movement; and furthermore, this hypertonus causes

a greater consumption of contractible material and accumulation of waste products leading to early fatigue.

F. Reaction to rest. Paradoxically, muscles which are the seat of an acute inflammatory process often pain more when at rest, as evidenced by the muscular cramps which come on at night or the extreme stiffness on awakening. This may be explained by frequent variations in tension coincident to frequent turning and strained postures during sleep.

G. Exteroceptive Impressions. Here those impulses referable to extraneous or environmental changes which are transmitted through the peripheral sense organs on the surface of the body may be considered.

Stimuli of pressure. Palpation of normal muscle causes no reaction but rheumatic muscles immediately betray their resentment by contraction of the muscle bundles pressed upon.

Variations in temperature. The fact that rheumatic muscles are extremely sensitive to cold, damp, or draughts, is common knowledge.

Variations in atmospheric pressure. Sudden elevations or downfalls are more effectual than continued periods of high or low pressure. These phenomena may be explained on the basis of the variations in muscular tension which are created.

II. Increase in Volume.—In health every muscular contraction drives blood out of the veins. During the period of relaxation they rapidly refill from the dilated arteries. The flow of lymph is augmented. In hypertonic muscles the arteries are dilated and the blood pours in, while the veins are being steadily compressed, congestion occurs and swelling ensues, the same as would occur in any organ in which such a state of affairs existed. Should this condition continue, a state of congestive induration results.

III. Local Rise of Temperature.—The local reaction of increase in temperature, which may be easily detected by comparing with the normal side, is due to the increased metabolic activity brought about by the state of continuous spasm.

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Book Reviews

Lovett's Lateral Curvature of the Spine and Round Shoulders. Fifth Edition, edited and revised by Frank R. Ober, M. D., Assistant Professor of Orthopedic Surgery Harvard University, Member American Orthopedic Association and A. H. Brewster, M. D., Instructor of Orthopedic Surgery Harvard University, Member American Orthopedic Association. Price $3.50. Pp 240 with with 201 illustrations. P. Blakiston's Son & Co., Inc. Philadelphia, 1931.

Those, to whom Dr. Lovett's book "Lateral Curvature of the Spine and Round Shoulders" has been a constant source of reference, will welcome this fifth edition revised and edited by Dr. Ober and Dr. Brewster and Dedicated to the memory of Dr. Lovett. The fundamentals of his research, experimental work and balancing of others' findings remain the same as it is largely upon this broad and unbiased foundation that the present knowledge and treatment is built. The essentials of the anatomy and movements of the normal spine are clearly and concisely set forth clarifying the careful descriptions of the various anamolies found in the scoliotic one. It is clearly stated that the treatment of a case depends upon whether the condition is due to faulty standing habits or fixed bony changes. The latter is a definite surgical problem and therein has the indiscriminate use of exercise tragically failed. In the review of operative procedures the main indications for such a course are indicated as: (1) rapid increase in poliomyelitic curves which are not being held by apparatus (2) signs of general debility or ill health due to the deformity (3) rib pressure with severe intercostal or pelvic pain (4) other severe cases where fusion will permit the patient to dispense with a jacket for the rest of his life. The application of jackets by several methods is carefully gone into, notably the turnbuckle jacket and shell. Three of the conclusions at which the writers arrive are that the force applied spreads the ends of the arc and does not disregard the mechanical law that the keystone is the strongest part of the arc, that it permits gradual correction and that it tends to decrease rotation as seen clinically and in the roentgenograms. The Galeazzi method, used in the clinic of that name in Italy, has been also added to this edition. In the opinion of Dr. Lewin and Dr. Steindler this treatment though severe seems a most satisfactory method as correction is carried out by derotation and deflexion rather than direct force. A vigorous follow-up treatment is necessary with this method as in all fixed jacket applications and for wearers of turnbuckle or other removable jackets regular visits to the gymnasium for massage and exercise are of utmost importance. Miss W. G. Wright has collaborated with the writers in that section devoted to exercise and it has been practically rewritten. The book is beautifully illustrated with case pictures, X-rays and diagrammatic drawings.

The Child's Mental Health*

By Douglas A. Thom, M.D.

The foundations of sound mental health are laid early in childhood. By mental health I mean a state of mind which permits the individual to approach his maximum efficiency and to attain the greatest amount of happiness out of life with a minimum amount of effort. It is therefore obvious that whenever a child has an average intellectual equipment and is in sound physical condition, whose school work is erratic, who is shy, diffident, unduly jealous or cruel, who is given to daydreaming, who has unusual likes and dislikes, or who attempts to avoid the realities of life through evasive tendencies, is given to lying, cheating, stealing, etc., it is safe to say that that child, for the moment is not enjoying good mental health. It does not necessarily mean that he is going to be a mentally sick person in later life or that his personality is in danger of becoming chronically twisted and warped, but it does mean that he is utilizing conduct patterns and is in the grasp of unhealthy emotions which, if they are long continued or exaggerated, will work out very definitely to his disadvantage.

It is safe to generalize and state that the health, happiness and efficiency of most adult individuals are to a very large extent dependent upon the habits and personality traits which they acquire during early life. Those who have made a study of personality development lay great stress upon the first six years of life. They are pointed out as being by far the most important. Dr. Arnold Gesell of the Psycho Clinic, Yale University, has stated, "In a developmental sense the child is indeed a pretty well finished product when his sixth-year molars begin to erupt. The pre-school years are incomparably the period of most rapid and most fundamental growth, whether physical or mental." This being true, parents assume a grave responsibility in providing for the child a healthy environment in which to develop.

The home, for generations past, has been looked upon as the workshop where children should be conditioned for social purposes. Training has been directed toward developing the individual capable of conforming to the demands of society, without undue effort, and with a fair degree of happiness and efficiency. Within recent years the prestige of the home, as the fundamental influence in child guidance, has been challenged; and, either rightly or wrongly, it is being asserted that it is in spite of the home rather than because of it, that many individuals reach the period of adolescence with a healthy outlook on life. Family life as such is undergoing a process of disintegration, and many of its responsibilities aind obligations are now being delegated to nursery schools, kindergarten, summer camps, tutors, and nurses. An ever-increasing number of parents are beginning to assume that—like the family washing—the educational and moral welfare of the child can be more economically and efficiently cared for outside the home. To this attitude toward parental responsibilities may be blamed much of the criticism that is directed toward the younger generation of today.

Notwithstanding the criticism that has been directed toward the home and parents, the fact remains that both will long continue to be dominating factors about which the physical, mental and moral welfare of the child must necessarily develop.

The responsibility of the mental health of children is not in the hands of psychiatrists, psychologists, and other specialists, but must be directly assumed to a very large extent by parents, teachers, and others making daily contact with the child, and although there are numerous and varied causes which disturb the emotional stability of the child, such as constitutional factors and physical defects, most of the problems seen during the early life of children bear a very direct relation of mismanagement on the part of adults, and undesirable habits and personality deviations are ofttimes the result of unfortunate and unhappy relationships between child and parent. This is due in part to the fact that parents start out with certain preconceived ideas as to just what they would have their children think and do, without taking into consideration the personalities with which they have to deal.

We are prone to forget during periods of emotional stress and strain that the child has a mental life. He has the same hopes, ambitions, and joys that are gratified and thwarted in very much the same way as they are in adult life. It is essential to keep in mind that the child is not endowed with the varied techniques which are necessary to meet life adequately. These varied means and methods are acquired only by training, experience, and to some extent, through teaching and education.

One can only mention in passing a few of the more obvious situations in the environment of the child which prevent him from acquiring adequate methods of social adaptation, and by social adaptation we mean the acquisition of habits, personality traits and mental attitudes which permit the individual to make the necessary adjustments to life in a way that is socially acceptable. In order to attain these conduct patterns the child must learn to modify those inherent tendencies, the purpose of which is purely self-gratification and the indulgence of his own appetites; that is, he must learn to postpone the pleasures of the moment for something that is more worth while, even though it be remote. His interest, in part at least, must be broadened so as to include his environment, made up of home, school and other personalities with which he makes contact.

The over-solicitous mother, who gets so much pleasure and satisfaction in doing for the child that she refuses to allow him to assume the responsibilities and obligations of his age, represents one of the greatest afflictions that can be thrust upon a child. Ofttimes

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this over-solicitude is carried out under the guise of mother love, but it is well to point out that interest and love alone on the part of the parent are not enough to insure success in meeting the innumerable problems which are presented during the child's early years. In fact, the very love the parent bears for the child may be the stumbling block that prevents his successfully fulfilling the obligations of parenthood.

An intelligent approach to many of the problems of childhood is prevented by excessive worry, anxiety and needless fear on the part of the parents. On the other hand, a child may have to contend with a cold, forbidding, disciplinarian type of father, who sets standards so high that the child invariably fails to achieve success. Such a relationship obviously develops a feeling of inadequacy resulting in lack of confidence and assurance to meet life not only in the home but later in the world outside. The same state of mind is ofttimes created in the child when he is constantly being compared to his disadvantage with a superior brother or sister, or when criticism, which is constant and flavored with injustice, is being metered out to him.

All too frequently we find parents utilizing what appears to be the surest and easiest of disciplinarian techniques—that of frightening the child out of his undesirable habits—telling him the dreadful things that will befall him if these habits are continued, or on the other hand, appealing strongly to the child's emotions and impressing him with his lack of love and parental devotion. All these measures may apparently work out well for the moment but they cannot be looked upon as being constructive in helping the child develop habits of conduct that will be permanent and useful.

We must keep in mind that parental handicaps due to mental defects, poor practical judgment, oversolicitude, unwarranted ambitions, self-centeredness, quick temper, too rigid discipline and lack of sympathy, all play an important part in the parent-child relationship, and that the mental conflicts which parents have in their own lives, both past and present, prevent a healthy, happy relationship between parents and child. Every effort must be made to avoid the parental attitude of domineering intolerance. Quite unconsciously we insult, humiliate, tease, ridicule, cheat, and perhaps worst of all, bore the child with our superior, intolerant attitudes. We cannot afford to be indifferent or ignorant as to the essentials that go to make up a healthy mental atmosphere of the home, which is the workshop in which the child has to develop a healthy mental attitude toward life.

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Mental Hygiene Problems of Children With Sensory-Motor Defects*†

By Bronson Crothers, M.D.

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Children who are handicapped by any obvious disorder, either of a sensory or a motor type, are bound to find difficulties in adjusting themselves to an educational and social routine worked out for ordinary individuals. They frequently suffer from entirely unnecessary difficulties, some of which are gratuitously imposed upon them by well-meaning teachers and relatives. The members of this Congress need not be reminded that one of the greatest achievements of modern psychiatry is the removal of obvious and unnecessary burdens from those whose minds work in unusual or unacceptable ways. In the physical field, the "stigma" is perhaps less obvious, but pity and pessimism are unnecessarily prevalent.

It is unfortunate, in the first place, that the handicapped child is classified and educated on the basis of his least useful characteristic. It is not only unfortunate, but inevitable, that such words as "blindness," "deafness," "paralysis," and so on, should be used. I see no way of avoiding these names, but I believe it can be demonstrated that a conception can be built up which deals not with the defect, but with the physiological residue that is still intact.

If we can study the residue from a physiological standpoint, we may find that certain educational measures, now generally accepted, are not completely valid. It may well be that less emphasis on the liability and more upon the assets will be possible.

Another rather discouraging idea is that destruction of the cells of the nervous system is never followed by recovery of function. While it is probably true that cells destroyed are not replaced, it is entirely untrue that restoration of function may not occur through adaptation.

If one looks over the methods of education and medical treatment of handicapped children, it is possible, I think, to defend a theory that education is satisfactory in direct ratio to the adequacy of the diagnosis and prognosis from a physiological and educational point of view. A clear example is infantile paralysis. In this disease the effects of infection are confined, for all practical purposes, to the anterior horn cells of the spinal cord. These cells are either destroyed completely or remain undamaged. Their only function is to stimulate the activity of definite muscle fibers. It is quite obvious that the physiological diagnosis can be accurately established by one of the simplest of mathematical procedures—subtraction. Subtraction is a process that all of us understand. We watch the process constantly and in every field of activity with relatively little emotion, provided we are convinced that the total capital is large and increasing and that the amounts subtracted are of manageable size and of known character. The process becomes disturbing only if any of the various factors are uncertain in amount or vaguely defined.

Since every one knows that complete mental integrity is part of the remainder after infantile paralysis, the educational problem is attacked cheerfully and efficiently by teachers, legislators, and every one else. The orthopedists happen to have dealt with the physiological remainder after infantile paralysis, and the complicated and effective procedures that they have developed show what can be done in the way of physical correction.

At the other end of the scale is the victim of so-called Little's disease or cerebral spastic paralysis. Here we are faced with a vaguely defined physiological residue dependent on a variety of agents. Medical opinion is confused, and in consequence educational procedure is neither clearly formulated nor consistently carried on.

The children with cerebral palsy have, by definition, some abnormality of structure of the brain itself. Most of them have had this abnormality from birth, or at least from early infancy. The perversion of motor activity may exist alone or be associated with any degree of mental defect. The tragedy is that a very general impression exists among teachers and doctors that mental defect is part of the clinical picture in almost all cases.

Naturally any attempt to change an attitude of bewildered pessimism to one of effective optimism must be preceded by evidence that a reasonable number of these children are completely intelligent and that rational and successful measures can be worked out for their training. It is worth while, therefore, to consider certain soluble difficulties that lie in the path.

It is abundantly evident that relatively few people, even among the medical profession, regard the brain as an integral part of the human body. In medical schools, it is possible to dissect the rest of the body accurately and to gain adequate information by sight and touch. The brain, unfortunately, cannot be conveniently studied in the same way, and the student is expected to visualize structures through looking at cross sections and diagrams. As a result he, quite properly, comes to the conclusion that the brain is a most complicated organ. Unless he has unusual curiosity, he resolves to practice among individuals who do not need rigid neurological study. Inevitably he soon finds that he cannot do this and still care for patients with general diseases. If he is fortunate in his teachers, he is driven back to anatomy and physiology, which he reëxamines, and he acquires an ability to interpret clinical problems in physiological terms. If he is less fortunate, he attempts to find names and descriptions of conditions similar to the one he is observing. The difficulty here is obvious. The most reliable and con-

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sistent clinical pictures are found among those affected by severe and usually progressive diseases of the nervous system. Just as the standard textbooks of psychiatry, a few years ago, were filled with clear descriptions of disabling psychoses, so the neurological textbooks still in active use are filled with depressing pictures of disabling organic conditions.

It is, I think, fair to say that the organic disorders of the nervous system in childhood are largely dependent upon infection and upon injury and relatively rarely dependent upon degenerative processes or defective heredity. I am quite aware that the textbooks are full of long descriptions of various degenerative diseases in children, and that certain enthusiasts regard heredity as overwhelmingly important. I can only state that in ordinary neurological practice, the child with a classical degenerative disease or a clean-cut hereditary disorder is unusual. The very rarity of the conditions mentioned stimulates the publication of these cases and encourages their exhibition to students.

If I am correct in believing that infection and injury are important—even if I am wrong in believing them to be predominantly important—it follows that every type of disability may be expected. On the whole, infection and injury are likely to damage the nervous system in any part and to any degree. It is unlikely that two or more individuals will be left with identical disabilities, and it is obvious that the search for an exact description and an adequate name will be futile. The logical alternative, of course, is to decide, as competently as may be, a few absolutely essential points which are needed for adequate management.

The first is the question whether the pathological process is progressive. If changes are taking place, medical investigation is essential and urgent and takes precedence over education.

Secondly, if the process is no longer operative, is the physiological residue without value? The answer to this question is one of the most important in medicine, yet methods of answering it—or, indeed, the necessity of answering it—are given little attention. Quite obviously an absolutely authentic decision that no valuable physiological assets exist is of great value, and the sooner it is made, the better. Such a diagnosis is valid only if the survey of assets is complete. It is justified if the child's intellect is grossly and demonstrably defective. It is also reasonably correct if moderate intellectual defect is combined with serious motor disturbance or with recurrent and unmanageable convulsive attacks. Here a very definite and very difficult problem arises. How early is recognition of mental integrity or deficiency possible and accurate? If a psychologist with special training is available, it is probable that sufficiently accurate information can be gathered by the latter part of the first year. The adequacy of the judgment is dependent, however, upon a clear understanding of the effect of various sensory and motor disorders upon performance. In any case, repeated observations should indicate, in most cases, the degree of intellectual capacity long before formal educational programs become a problem.

The presence of convulsions is, of course, a very definite element in any case and, on the whole, leads most people toward gravity, if not toward pessimism, in prognosis.

One of the highly respected traditions of medicine is the statement that parents do not recognize mental defects in their children. This statement has some validity if it is changed to "admit metal defects." Even so, it is arguable that the reason is not ignorance on the part of the parent, but a grossly wrong attitude on the part of the doctor. Statistical analysis of this question is not possible, but most parents will admit an educational difficulty and discuss it fairly and without reserve, whereas they defend themselves and their children against what is frequently presented as a familial taint.

In no case with lesser degrees of disability should complete pessimism be regarded as reputable until carefully conducted educational procedures have failed to indicate a way out. This question will be considered again later on.

If the pathological process is no longer active and if bankruptcy is not acceptable, the doctor, as a medical man, steps aside and presents the problem to teachers. This procedure is effective if he can present with the child a clear analysis of assets and disabilities, and if he can find a suitable and optimistic teacher.

Here, again, a curiously inadequate division of labor and of opportunity exists. The doctor, by education, is theoretically able to define the assets of the child and set the limits within which education is feasible. Practically, he puts all sorts of almost insurmountable obstacles in his path. In the first place, he is likely to work in a conventional hospital. The handicapped child is put to bed in a ward. The two vitually important matters to consider are behavior and reaction to educational efforts. The conventional procedure is to abolish activity by putting the child to bed and to isolate it from educational procedures. The complete futility of this method is theoretically apparent and practically demonstrable. The result, of course, is that these children are usually not studied at all in infancy unless some surgically manageable complication is evident.

The effort to teach is not made, ordinarily, until the handicapped child is thrown, without preliminary investigation of any effective sort, into competition with ordinary children at school age. The stage is set for stress and disappointment.

Obviously a few children survive this rather brutal trial-and-error method. Of course, a number of unteachable children are properly discarded. But a good many of them struggle along with predictable and unnecessary disappointment and failure.

The way out, in general, seems evident enough. We all know that the years between birth and six are important. Almost every child with gross disturbance of the motor or the sensory machinery is under some sort of supervision long before school age.

If those responsible for supervision could be persuaded that any peculiarity or defect not dependent on active disease should be considered as an obstacle to a satisfactory adjustment in school, plans could be made to solve the recurring and baffling educational problems. It would then become quite obvious that children with fixed lesions of the nervous system should be described in terms of valid remainders for purposes of education and in terms of defects for purposes of medical classification.

The doctor as a medical therapist has certain continuing duties. Every now and then operations should be performed or apparatus should be altered, and these various details should naturally fall under his supervision. In the main, however, he should regard himself as one of a team engaged in planning an adequate educational routine for the child. His place in the team is often that of a leader. This position may be deserved or its retention may be frankly impertinent. Obviously, a physiotherapist, a psychologist, or anyone else may be the ingenious and productive member who does, and should set the pace.

If a group undertakes the work of defining the type of education likely to benefit a child, before formal school begins, it is probable that a new bit of machinery must be created, which will have the same relation to special

classes and to custodial institutions for cripples as the child-guidance clinic or the psychopathic hospital has to custodial institutions for children or adults.

A description of the machinery now in operation at the Children's Hospital in Boston shows the type of institution that seems to us likely to assist in the wise and early solution of the educational problems under review.

I. *Relation of Special Unit to the Hospital and to the Community.*

The Children's Hospital is one of a group of institutions connected more or less closely with, but not controlled directly by, Harvard University. Special clinics for obstetrics, psychiatry, and so on, as well as a large general hospital, are near by. In addition, we have a convalescent home within a few miles and, by close association with a hospital home for children, we can rely on coöperation in the care of seriously handicapped children who need prolonged medical observation. Various other conventional organizations, both medical and educational, are available for help. In addition, a most efficient commission, under university auspices, is coöperating with the state in supervising infantile paralysis and meningitis, and another is fostering research work in epilepsy.

At first glance, this formidable equipment seems not only adequate, but excessive, yet we felt, after many years of study, that we had failed in many ways to develop a rational and effective method of discovering educational assets and outlining plans of training.

Through a liberal grant from the Julius Rosenwald Fund of Chicago, and through the generous support of our managers, we are now equipped with space and with people to work in it. At the risk of stressing a plan that might be impracticable under other conditions, it seems worth while to present the scheme in some detail.

II. *Personnel.*

1. The director is neurologist to the hospital, with responsibility for a special clinic in the out-patient department and for consultation in the wards of the other services. He is assisted by one man who is doing research work in neurological surgery, a clinical associate, and a resident interne.

2. Fortunately we have been able to engage the interest and service of a trained psychologist, with adequate experience among small children, who accepts the challenge of attempting to establish intellectual levels in the presence of motor or sensory disorders.

3. A psychiatric social worker, whose main duty is in the general clinic, but who is available for consultation, is an important member of our staff.

4. A physiotherapist, who has devoted many years to the physical training of children with disorders of the nervous system in the out-patient department, is now devoting most of her time to the special group of children in the new unit.

5. We are still a bit uncertain as to the exact place that should be occupied by a teacher. At present we are dealing with children too young for formal academic work, and are chiefly interested in the type of nursery-school education that is increasingly prevalent in this country.

6. We have in mind the complicated problem of dealing with special disabilities of speech, reading, and so on, and for this purpose propose to enlist the aid of research associates from the Harvard Graduate School of Education.

7. Nursing service of the usual type is, of course, available.

III. *Physical Plant.*

The physical plant seems to us well adapted to its purpose. The special unit occupies two out of five floors of a fireproof building. The other floors are thoroughly equipped and staffed for physiotherapeutic work, including adequate facilities for heliotherapy and a pool where exercises can be carried on in warm water. Outside is a small playground with sufficient equipment and space to serve our purpose.

The unit occupies, as I have said, two floors. The plans are largely self-explanatory. The dormitory is devoted to a group of children of approximately the same age and type. The isolation rooms exist in order to enable us to protect the majority from minor infections or to segregate cases not easily cared for in the open dormitory.

Each child has a locker, and every effort is made to make each child care for his or her belongings. It will be noted that a very large and well-lighted space is set aside for toilet facilities. The establishment of acceptable personal habits is so important that we have provided space and suitably constructed fixtures on a considerable scale.

On the same floor several individual rooms are provided. At times these can be occupied by children who are not suited to the large dormitory for some reason, but their chief usefulness is to allow us to invite mothers to live in the hospital while they watch proceedings. It is our hope that we cannot only work out an acceptable educational program but demonstrate it and interpret it before discharging the child.

On another floor a relatively large space is occupied by a playroom and a schoolroom and arrangements for psychological investigation, as well as conventional office and treatment rooms. In addition, an isolated room with a continuous bath is available for suitable cases.

Taken as a whole, it is clear that we are in a position to attack the problem rationally. In the first place, we are no longer forced to go through the futile process of studying behavior by abolishing it and of fostering education by making it impossible.

At the same time, the unit is an integral part of a thoroughly equipped teaching hospital, so that all the resources of scientific medicine can be brought to bear on suitable cases. The fact that the work is conducted in coöperation with other services simplifies all sorts of problems of apparatus, contagious disease, hospital administration, and so forth.

It seems to us that the validity of the attempt to conduct educational experiments on what is conventionally regarded as medical material is clear. Naturally, like everyone else trying out a new method, we are probably overestimating the importance of some factors and ignoring others.

If the general idea is sound, it is clear that we will all —doctors, teachers' psychologists, and the rest—become students and practitioners of education. The change of status has vast advantages. A period of observation of several weeks seems long indeed if labelled "medical." If, however, we can be regarded as teachers, a few weeks is a very short period for the establishment of a valid program in a complicated case.

We hope to be in a position to save many of the children under our care from unnecessary difficulties in adjustment later on by deciding, before school age, certain questions that would otherwise be settled by the usual brutal method of trial and error under conditions unfair to the child.

In the first place, we are trying to discover adequate ways of appraising the intact physiological residue. If this residue cannot be utilized, we attempt to show the family the futility of forcing an incompetent child into competition in which failure is inevitable. We recognize

fully the extreme importance of accuracy and make use of every technical and social resource at our disposal in these cases before acknowledging defeat. Obviously, if failure can be predicted before repeated disasters have embittered the family and discouraged the patient, a considerable amount of wear and tear will have been avoided.

Next, we are prepared to try out various methods of education in cases where tradition suggests that pessimism is in order. Children handicapped by chaotic choreiform disorders due to fixed lesions are typical examples. The attempt to discover methods of dominating the bizarre extrapyramidal type of disturbance by encouraging new patterns is, it seems to us, worth making.

In principle, our whole effort, in this particular unit, is to reduce all our problems to definite terms. If we can do that, we hope to be able to define the physiological assets and predict the educational progress of these children as satisfactorily as is now done with children with infantile paralysis.

Obviously, the vast subject of mental hygiene for children handicapped by disorders of the nervous system will not be solved by the procedure outlined above. The next step, however, can be foreseen with some clearness. If doctors and parents and teachers realize that medical nomenclature must necessarily be dominated by defects, but that educational programs must be based on remaining assets, a new attitude can be fostered. It is conceivable that the whole group of children can be regarded as a series of stimulating challenges to educational methods instead of as a load to be carried with pessimistic fortitude.

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Fundamentals of Occupational Treatment in Spastic Paralysis

By Susan Allan Paisley, O. T., Department for Handicapped Children, Los Angeles City Schools

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In looking back over the short history of the development of occupational therapy, the therapist of to-day cannot but be impressed by the rapid and scientific advance in methods and their application to an increasing number and variety of diseases and handicaps. Although not a matter of many years, it is a long step from the idea that perhaps there were advantages—not the least of which was financial benefit—to be gained by furnishing occupation to *mental* patients, up to the present use of occupation as a strictly therapeutic treatment.

Only a few years ago the occupational therapist was taught that the activity must be actual work or the making of some article. But scientific study has developed and broadened the scope of this branch of medical science into the present accepted understanding that it is *any* activity, mental or physical, definitely prescribed and guided. And what volumes those few words contain. They were the emancipation proclamation for many therapists.

Most especially is this true in treatment of children. The therapist whose work is with handicapped children must overlook no activity which will be the means of holding the interest and gaining the co-operation of the child. It makes no difference whether it be work or play. And in fact it may often be a very simple game or play which will bring the best results. For it must be remembered that the crippled child is not only handicapped in his working powers. His disability also interferes with his normal play activities. For this reason it may be far easier to gain his voluntary effort through play. One small boy whose twisted little arms were capable of almost no flexion or extension had a thrilling time fishing. The fish was only a roll of felt tied around a small lead weight, the fish line a long cord thrown across the top of a high loom and reaching to the floor. But it seemed very real to the poor little fellow as he struggled to reach out, hold on to the line and then pull it in. It slipped and dropped back sometimes, but with a little help and encouragement he finally got it up and he then cried triumphantly, "We'll cook it to-morrow!"

The fish may be a variety of little surprises which he can discover only when he has "landed" it. This element of uncertainty adds zest to the effort.

So, by all means, if play results in the desired muscle or joint action, use play. In so doing you are putting something into the youngster's life which is his birthright but of which he is being cheated through his physical misfortune.

The work of re-education of spastic children is a task from which may therapists shrink. The spastic child is not usually an attractive subject because of the incoordinated jerky motions, the muscular rigidity, the very common speech defect, the not infrequent drooling and the mental retardation which is so often just another manifestation of the brain lesion. The first contact of the therapist with this type of handicap leaves her all too often shrinking from the apparently futile effort. For the spastic muscles may be somewhat relaxed when the child is otherwise attracted, but the moment he attempts to use them or his attention is called to the handicapped arm or leg, it stiffens, flexes, and is utterly useless.

Until a few years ago, the only help given to these little victims was through orthopedic surgery. To-day, the orthopedic surgeon does all he can to relieve the deformity. And then he frankly says: "This is all surgery can do. It is now a matter of "follow up treatment." And because the improvement of spastic conditions is so emphatically a matter of reeducation, which can be accomplished only, through the voluntary effort of the child himself, it follows that occupational therapy is the logical "follow up treatment."

Dr. Harry J. Schott, a member of the staff of the Los Angeles Orthopedic Hospital School and visiting surgeon for the Classes for the Handicapped of the Los Angeles City Schools gives the following opinion regarding the value of post operative occupational treatment for spastic children:

"There is a very definite place for surgery in the treatment of this class of case, in order that the child may be prepared, as it were, for the further and extremely important non-surgical work.

"The great difficulty in treatment of celebral palsy cases is to reestablish co-ordination of movement. Surgical procedures are done with the object of correcting deformities and putting the patient in such condition that he may be capable of performing co-ordinated movement under supervision.

"Careful supervision by the physio-therapist and occupational therapist are of the utmost importance in securing satisfactory results after all necessary surgery has been done. The physio-therapist directs her energy largely to attempting to co-ordination of movement in exercise, but I believe that of greater value is the service rendered by the occupational therapist in teaching organized movement directed toward some useful end.

"All movements, of course, must be carried out in a slow rhythmic manner, in an effort to make a completed motion, as nearly perfect as possible. The importance of slowness in movement cannot be over-emphasized, as the difficulty in this work is in securing muscular relaxa-

tion, which is accomplished only by slowing down the muscle reaction time.

"Many cases which appear practically hopeless at the beginning can be made self-reliant, and reclaimed for some useful occupation by efforts along this line of development. Weaving has its distinct advantages, and is one of the most valuable forms in which occupational therapy can be directed, as it not only teaches coordination of hand movements, and also co-ordination of movements of the feet and legs, but also co-ordination of both upper and lower extremities.

"Almost any form of occupational therapy can be used if directed properly toward selected cases. It must be born in mind that any type of physical therapy or occupational work can not be successfully carried out unless there is a sufficient I. Q. to enable the child to co-operate intelligently. I believe that a large percentage of the failures to secure satisfactory results is due to this factor."

The spastic child is not a cripple and should not be so considered. He is handicapped. The word "crippled" carries with it the idea of permanent disability. If the word "uneducated" be used in its place a more hopeful aspect is given, for the ignorance need not be permanent and education is for those who care enough to work for it. It does not take long to make the substitution of words a habit and the idea of educating the handicapped member or members is a constructive one. It helps much to overcome the negative attitude so prevalent among those afflicted with this type of disability.

The first thing the therapist must do is to get herself into the correct mental attitude to tackle and study the problem. She must realize that the spastic child, handicapped by no fault of his own, has the same right as any other human being to as normal a life as possible; with all the mental, physical, and spiritual growth he can attain. Her efforts if directed toward physical development alone are doomed to failure, because the results of the physical training depend upon the mental ability to grasp and direct his own efforts. Therefore the aim is for mental stimulation and co-operation and as much character strengthening and development as can be wisely introduced into the treatment. The task is a long labor of reeducation of physical and mental habits. It means repeating over and over every day each step in the process until it becomes automatic. The difficulty is very often magnified by the fact that the physical cause of the disability has left its retarding mark upon the mental faculties.

A most important factor to be met is firmly fixed wrong early habits of thinking and doing. If parents were taught the necessity of proper early training this would be greatly minimized. The correct time to start occupational therapy with spastic children is when they are beginning to learn to use themselves, to play, to try to walk, to use their hands and feet. The problem would then be the simpler one of education rather than the difficult task of reeducation. It is to be hoped that the time is not far distant when specialized pre-school training of the spastic child will be possible.

Through over-indulgence or neglect the child becomes satisfied to be "crippled" as he puts it. He is usually inattentive and often naughty and trying, because he wants his own way. But the therapist must always have the situation firmly in hand and the child must recognize this fact. I do not mean by this that discipline should be forced or even in evidence. It is poor psychology ever to make an issue of discipline. The therapist is a leader, not a driver, and the successful leader always holds the interest and secures the co-operation of his followers. Co-operation is essential in this instance for the spastic child makes no improvement without his own *voluntary* effort.

Ideas of true sportsmanship and an understanding of the true values of behavior are always matters for consideration. They should have as great a part as possible in all activities. The tendency to capitalize the disability must be eradicated, if possible. At all times great patience and an encouraging cheerful attitude are characteristics the successful therapist must cultivate.

The basis for the normal development of the spastic child is the cultivation of *conscious relaxation.* This means a co-ordination of the mental habit of thinking "relax" with the physical act of relaxing. The mere idea of trying to do any definite act will produce a tenseness. Therefore the mental suggestion is not to try, just to let go. After he learns to relax the child is surprised at the ease of motion.

Experience has proven that relaxation is much more easily secured if the body is supported. This is demonstrated by the use of pool work in warm water. The temperature of the water has a sedative effect upon the nerves and the support of the water removes the body weight and permits relaxed and free movements.

This should be remembered in all forms of treatment and support always provided during occupational treatments. Arms may rest upon a table, a desk board laid across the arms of the wheel chair or upon the knee of the therapist. If the motion includes full extension of the arm she may support the forearm with the palm of her hand.

A fact which is often overlooked is the position of the feet of the child when sitting. Rarely does he keep both feet firmly on the floor. If he rests his shoulders against the chair back and sets his feet flat upon the floor, relaxation is less difficult. If he lifts the heel or toe of one foot from the floor a feeling of tenseness is immediately apparent. The therapist soon learns to detect without looking the removal of support by the increased bodily tension.

The fundamental lack in all spastics which is directly responsible for much of the physical incoordination is the absence of body balance. Especially is this true in quadriplegia cases. Great improvement in coordination cannot be expected until this vitally important fact is taken into consideration.

The typical spastic carries most of the weight on one leg which causes one shoulder and hip to be held higher than the other and also results in steps of unequal length —the shambling limp. If the knees are bent the upper part of the body tips back and the head and chin are held forward in an effort to compensate for the unequal distribution of weight. In such a position relaxation is well nigh impossible.

When a normal baby begins to walk he has not yet acquired the power to keep his balance. His little body is tense and the one or two steps are rapid else he would fall. Balance is less difficult to retain if the pace is quicker. As he learns to acquire and hold his balance his body relaxes and his steps are slower.

The spastic child in his customary unbalanced posture makes all his motions quick and jerky. If we are to strive for a normal child, the first thing to secure for him is a firm basis upon which to build his future physical development. Let us start by teaching him correct posture and balance. When he is properly poised (and it is usually necessary to support his shoulders by putting an arm about him) his body will be much less tense and more natural motions are possible. The position of the shoulders and chin and of the feet and knees must be

especially watched. The feet should be apart and set straight. Then the hand learns to touch things without clenching and motions are made slowly and rhythmically.

Properly selected music aids greatly in acquiring balance and relaxation. Unwisely chosen music may have exactly the opposite effect. Nothing quick or stimulating should be played for these children. If anyone wishes to test the truth of this statement let him start a stirring march in the room where he is working with a spastic child. Immediately all relaxation is impossible. The mind is keyed to the quick movement of the music and the body follows its lead. The decided beat has the effect of increasing the muscle tention. The quick jerky motions are accelerated by the rapid tempo and the result is pathetic indeed.

The benefits to be derived from the use of music are a sedative effect upon the mind, the setting of a slow rhythmic pace for all motions and the development of smoothness in motion through mental and physical relaxation. It follows, therefore, that the music used must be slow, rhythmic, and dreamy. Best results are obtained from waltzes or music in six eight time played very slowly. Hawaiian music is especially good for this purpose because of the regular movement, the dreamy rhythm, and the absence of any decided metrical beat. The unstressed accent of the first note of each measure is sufficient to set the pace. An entire measure is allowed for each count. First have the child lay his hands on yours and follow your motions as you work that he may acquire the "feel" of the rhythm. It makes no difference what the activity is, *if all be done in rhythmic motion.* Weaving, basketry, planing, sandpapering, walking, dancing, can all be carried on in rhythmical motions. Slow regular repetition of the body movements induces relaxation and repose. In severe quadriplegia cases it is often wise to start treatment by balanced walking and rhythmic motions only, without any other occupation. The child learns to understand rhythmic music and to enjoy keeping time to it in walking and slow movements. He begins to imagine he is really dancing, and through the rhythm finds a new mode of self-expression. As soon as he is able to increase his activities without undoing the good obtained he goes on to other activities, games, and work. Every step planned in the course of the treatment must be a normal activity with a normal reason and a normal appeal to the child. For the paramount object of all our efforts is to develop as normal a child as possible. And this may only be accomplished through normal activities.

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Psychiatry and Physiotherapy

By Leo Bartemeyer, M.D.

Read before the American Physiotherapy Association, Detroit, June, 1930

The responsibilities of the physiotherapist when caring for the psychiatrist's patient, are of a more serious nature than those encountered in treating a physical illness, and a keener appreciation of their character will make for progress in the care of the mentally sick.

Mental illness as we now know it, whether it be a mild psychoneurosis or a severe psychotic disorder, has usually had its origin in various aberrations of the personal relationships. The individual whom the psychiatrist refers to the physiotherapist for treatment has acquired the status of a patient largely because of inabilities to adequately adjust himself to various social situations encountered in his dealings with other individuals. Mental illness as such, is often characterized by the unhealthy combination of methods enployed by the patient in dealing with the environment. In most instances, other people have been largely responsible for the occurrence of the functional illness. As we now view the situation, we are of the opinion that most psychiatric problems begin early in life. It is a well-known fact that parents have usually been at fault, and not too infrequently because they have over-protected, misunderstood and failed to permit the child sufficient freedom of thought and action, so that a normal psychological development could have taken place. Had they been less fearful of what they considered the child's incapacities, had they credited their youngsters with the thinking ability which they possessed, had they understood, had they trusted, it is likely that a greater number of adults would have avoided the pitfalls of mental illness. Now all of this has a close bearing upon the effectiveness of what we as physicians, and you as our colleagues, do for the individual who is in need of psychiatric care. The methods of psychotherapy employed in an attempt to bring about a social readjustment of the distorted personality all depend so largely upon various components in the relationship between the patient and those with whom he comes in contact. Whatever transpires in the social situation which is made up of the physician, the nurse, the attendant and the physiotherapist, is now regarded by psychiatrists as of extreme importance. Whether or not and how rapidly the patient will recover hinges so largely upon the things we say and do in the presence of the one who is sick. Our everyday experience in practice reveals startlingly enough that although we aim to assist, we all too frequently actually harm or interfere with the recovery.

The physiotherapist who is afraid of the mentally sick persons sent for treatment, communicates such an attitude to the individual without voicing his dread to the patient. This cannot be of value. During the administration of a continuous tub, it is possible to unintentionally undo within the course of an hour much that the physician has accomplished over a period of days. It is only natural that one should wish to know something about the difficulties which the patient is encountering, but these can always be learned by questioning the physician, and to proceed to inquire of the patient is seldom a good practice. The physiotherapist who manifests an attitude of kindness, a bearing which exhibits a trustfulness, a willingness to listen and to attempt to understand what the patient has to say during the course of the treatment, is undoubtedly rendering the patient and the physician a type of service invaluable from the therapeutic standpoint. As a general rule, one may always feel as being on the safe side of a situation by saying as little as possible to the patient, without making the contact too clumsy. Topics of conversation should tend to include only casual remarks. To become angry with the patient, to massage more vigorously because of having been insulted by him, is usually synonymous with aggravating his difficulty, and is unquestionable proof that the one giving such treatment misunderstands the illness. Lamentably indeed, the notion that many of the mentally sick are just imagining or putting on, still prevails in many of our best institutions. These are some of the salient points of responsibility shouldered upon the physiotherapist in the treatment of those who suffer from mental disorder.

In dealing with any patient, it seems to me, we are all working together as members of a team which has for its object the reorganization of the one in our care. It often happens that while a patient is alone with the physiotherapist, he spontaneously volunteers information of a highly valuable nature to the psychiatrist. It would be so helpful in the care of these sufferers if an attempt were made by the one giving such treatment to make notes which could be incorporated as a part of the record and might conceivably be responsible as a lead in further assisting the patient. I would encourage you also to record your observations concerning anything which might seem of importance to you during the course of your treatments. I refer particularly to facial expressions, the rapidity or slowness of movements, the manners of the patient, the attitude of the patient toward the treatment itself, the postures assumed, and some notes about circulatory and respiratory changes. To record that "the patient responded well," or to write down that he "responded badly," to indicate that he "quieted down," or simply that he "struggled," is usually not sufficiently informative to make it worth while as a part of the report. You cannot possibly make an error by rendering the psychiatrist a too-detailed account of what happened.

You can all appreciate that we do not rely upon physiotherapy as a method in itself of ridding the patient of his illness; we look upon it as a most helpful adjunct, as one of the important factors in the treatment of mental disorder. It is employed in only certain stages and certain situations of the period of illness. To practice psychiatry without physiotherapy seems well nigh impossible, but I would admonish you in all instances to be certain of exactly what is wanted by the physician, to insist upon explicit instructions from him and then to follow the suggestions as rigidly as possible. Try to avoid doing anything which you yourself might consider expedient. If

you are inclined to administer more than what is prescribed, why not frankly discuss such plan with the doctor before putting it into execution. Inasmuch as you may unintentionally make his subsequent dealings with the patient more difficult, it is always better to ask as many questions as you choose, rather than to take things into your own hands. Naturally enough, those patients suffering with psychoneurotic reactions, are curious in various directions. They often want to know of you what the doctor meant when he said so-and-so; they are inquisitive about the medicines which they are taking; they have forgotten to ask the physician something in their interview with him and they put the question to you. You, like the physician, symbolize authority and a knowledge of illness. It is usually the responsibility of the physiotherapist to refer all such matters to the psychiatrist. There may be times when you will have to assume an ignorance much to your dislike, but if you will remember that the patient's difficulties represent the nexus of a difficult situation which the physician has the responsibility of attempting to disentangle, you will not be unwilling to profess no information about these matters. Common sense and practical judgment in dealing with the psychiatric patient are guideposts followed by the physician and should likewise serve the physiotherapist who works with him in the treatment of those whose problems are infinitely intricate and so difficult of solution.

Detroit, Mich.

Confusion in Interpretation of Muscle Function

By J. W. McCammon, M.D., Cincinnati, Ohio

When one challenges the statement of "Authority" it is not sufficient to make an assertion which is contrary to all accepted views and then pass on with the casual comment that "there is no need for burdening you with a long discussion as to why this is so." As a matter of fact, failure to explain fully, immediately raises doubt in the mind of the reader as to the accuracy of the assertion.

Such was the reaction of the writer to the statement appearing in an article in the PHYSIOTHERAPY REVIEW for September-October 1930* referring to the hamstrings, both external and internal, as powerful extensors of the knee joint. I take this opportunity, therefore, of offering a criticism of the statement and of calling attention to some facts apparently overlooked.

In the first place it must be borne in mind that the hamstrings by virtue of their origins and insertions exert a powerful action on both the knee and hip joints and under ordinary conditions these muscles act with others to coordinate simultaneous motions in these joints. Consequently before one can say what the pure knee action may be he must carefully throw out all action of this group of the hip, and vice versa.

Now consider the demonstration suggested, namely placing the foot on a chair and then attempting to step up. It is true the hamstrings become taut, but the hint of an explanation given in the article is incorrect:

(1) The foot is the *only* fixed point.

(2) The pelvis *cannot* be fixed *at the same time;* otherwise extension of the knee is impossible. Either the pelvis or the foot must move to permit the increase in length caused by straightening the leg.

(3) The hamstrings are taut due to their action in steadying the pelvis and aiding in extension at the hip as one rises to the erect position in stepping up.

(4) The insertion of the hamstring gives a lever of the third type—that is the acting force (hamstring) is between the resistance or object to be moved (foot) and the fulcrum (knee), which means that only flexion can be produced unless the knee is thrown into recurvatum (hyperextension).

If, instead of the foregoing, one takes a position similar to it—flexed hip and flexed knee—but with the hip fixed and the need for stabilizing action of the hamstrings thereby obviated, he can then obtain a true picture of the pure knee action of this group of muscles. Such a position is obtained by sitting on a firm-bottom, straight-back chair with the pelvis firmly against the back. Now lift the thigh about two inches off the chair so that there is no pressure on the tendons of the hamstrings and so that they can be easily palpated. With the leg in this position, if one will attempt to extend the knee and thereby elevate a heavy weight placed on the foot he will find the hamstrings quite relaxed, more so the greater the effort at extension. Only on flexion do these muscles tighten.

Briefly in summarizing we may say that one must distinguish carefully between flexor action at the knee and extensor action at the hip, and this same care in observation and interpretation must be carried over into the study of all muscles having a dual function.

707 Race St.

*Folly of Authority. Stewart, Steele F. PHYSIOTHERAPY REVIEW for Sept.-Oct., 1930.

"Fender Fracture" of the Tibia at the Knee

By F. J. Cotton, M.D., F.A.C.S., and Richard Berg, M.D.

Reprinted by permission from the New England Journal of Medicine, Vol. 201, No. 20, pp. 981-995, Nov. 14, 1929

The automobile in contact with the jay-walking citizen has brought a previously rather rare fracture type to the fore.[1] This is the fracture of the outer side of the tibial head, produced by abduction of the leg forcible enough to smash the external tuberosity against the fulcrum of the outer condyle of the femur. One may produce this result, of course, by falling down stairs, bu the automobile furnishes the simplest, most fashionable way of doing it. The tire or fender strikes the outer side of the standing leg, with the leg locked in extention, and something *must* give way. It may be, unusually, the outer condyle of the femur. It may be, and not rarely is, the internal lateral ligament, but commonly the tibia gives way first, and the limb is jammed into a knock-knee deformity. It is purely a *crushing* fracture.

Naturally, such a crushing fracture gives comminution, a sort of bone mush, with no real main fragment as a rule. Put up in plaster in the usual way, the leg retains the knock-knee deformity, increasing a bit as the padding shrinks, and the muscles begin to pull; worst of all, the crushed tuberosity, throwing out little callus, furnishes but a poor weight-bearing surface, even at the new angle of weight-bearing.[2]

The *risk* is of a knock-knee with abnormal lateral motion, not very serviceable in walking; and this risk is real.

The *problem* is to return this mashed-out tuberosity to something like normal contour, and to keep it there until it is solidly glued in place, with such added new bone as may be obtained. This means long continued protection.

Attractive as open operation seems, it is not the answer in these cases. I've done a few of these operations, a few years back, one lately, and shall do no more, if I can help it. The results were not bad, nor too good. The trouble is that one finds usually no major fragment to work with, nothing to pin into place. Operation means a certain amount of fresh trauma and reaction, a certain delay in resuming function. My operative cases did well enough as to stability, not so well in the recovery of knee flexion.

We do better, as a rule, by correction of deviation of the limb as a whole, that is to say by correcting the knock-knee to as near a bow-leg as we can manage, and then *jamming* the fragment-mass back where it came from. Thumbs do this pretty well, but I have not scrupled to use a hammer, driving the displaced fragment in and upward (do not forget the *upward* replacement) into position, into such impaction as one may contrive.

Once the fragments are reasonably well in place, one puts on a Thomas splint, with traction enough to hold it in position, and then sets in place two Pearson screw-padplates, one to bear on the internal condyle, the other on the outer edge of the tibia close to the joint: this last pad may press on the fibula moderately, for, after all, the fibula head is usually displaced outward with the tibial mass. Remember the external popliteal nerve, and do not press too low.

This is not a comfortable treatment, but it is tolerable, *and it works*. It should be kept up for about three weeks. After that a plaster "cast" is permissible. (In practice, rather than a plaster, I have preferred a "convalescent caliper" brace with a screw-plate bearing on the inner side of the knee. This has been continued until the x-ray shows completed repair.) Weight-bearing should not be allowed for eight weeks at least. Treated in this way, these fractures do well. Neglected, or kindly treated, they result in knock-knee deformity, sometimes extreme, in instability, and in uselessness.

It is worth noting that of the fifteen cases, there have been three seen in the past year in which inadequate treatment, or none, has left almost total disability, and an older case (of my own) was equally regrettable, while none of the properly treated cases has shown lateral instability or knock-knee, even if joint motion in flexion was limited to an extent.

There can be, I think, no serious argument as to the importance of treatment, little as to its general form. The routine outline here followed seems satisfactory, and has produced results. Forrester, in his recent book[3]—appearing since the above was written—has a rather ingenious method of splint-plaster handling. It *should* give earlier joint motion than my routine; as to stability and avoidance of deformity, I have as yet no opinion.

Herewith presented are brief histories of fifteen cases, and four added thereto, in which like trauma produced the *equivalents* of what we are calling "fender-fracture," a name open to criticism, but concisely descriptive, of the trauma at least, chosen because one needs a term to call attention to a class of injuries that seem rather trivial but are fraught with danger of very real trouble.

One may suspect that many of these cases are treated in the routine cast without reduction, and without the especial after-care seemingly essential to decent end-results.

Limited space would not allow for the case histories.

[1] Just as pelvis fractures, once almost the monopoly of coal miners and construction men, may nowadays happen to any of us who cross the street or ride.

[3] Imperative Traumatic Surgery, C. R. G. Forrester, Paul B. Hoeber, Inc., 1929.

Physiotherapy for Fender Fractures

By Lucy A. Marshall

Physiotherapy is started on cases of Fender Fracture as soon as the patient is put into walking apparatus.

We are dealing with a leg in which the knee joint must be properly protected and kept in good position for a considerable length of time, probably about three months.

If nothing is done to get a good functioning knee joint during this period it is safe to say that the end result will not be satisfactory, either to the patient or the profession.

The patient reports for treatment three times a week for the first few weeks. Baking in some form (I prefer infra red) for the circulation of the entire leg, and whatever massage is necessary to reduce swelling and limber the muscles.

The baking and massage are considered preliminaries, being used to get the leg in the most favorable condition, so that the patient can do his part of the work most effectively.

This point is impressed upon the patient from the very beginning, that the Physiotherapist can and will help to get the leg in condition so that *he,* the patient, and he alone, can make that knee do its work.

Then work is started on active contractions of the muscle groups of the entire leg, particularly the quadriceps, until the patient can readily contract and relax each of the muscle groups without attempting to move the knee joint. The term "static" has been used for this type of exercise and seems to be a very fitting classification.

The next step is *active* flexion and extension of the joint. Passive motion is absolutely taboo.

1. Side lying, injured leg on top, pillow between thighs so that the legs are separated sufficiently to allow the weight of the leg to keep the knee in corrected position. In this position no pressure comes on the fracture. Flexion and extension.

2. Standing on good leg, thigh of injured leg abducted and held against a table. Pendulum motion of the lower leg. This is valuable in loosening up the joint and works rapidly.

When 50 per cent of the flexion has been attained, add

3. Lying on face, leg in slight abduction. Flexion and extension with emphasis on keeping the foot over toward the leg while bending and extending. When this is accomplished the exercise is made more vigorous and of a rug-beating nature.

4. Sitting with leg hanging. Weight on opposite hip, thigh of injured leg abducted and inwardly rotated. Flexion and extension. Work for full extension.

5. Rocking chair exercise with foot wedged against baseboard.

6. Sitting with both legs hanging. As one leg straightens the other knee bends. Teaching the patient to work against his own resistance.

7. Standing, weight equally divided. Alternate knee upward bending. Making sure that the quadriceps are tight and the knees are not flexed when weight is put on them. As soon as this can be done evenly and in good rhythm walking can be accomplished without any limp.

Because the patient has good control of his muscle groups he knows that they will work and are strong enough to move the weight of his leg in some measure.

To tell a patient who has had a fracture and immobilization just to bend his knee is courting the reply "I can't." And can he be blamed? He does not know how to do it and he knows that it is going to hurt, and who enjoys the prospect of pain? It does not take much persuasion to get the patient to work like a Trojan to make his muscles strong enough to make the knee bend more each day.

The patient gets heat on his leg at home once a day for 10-15 minutes and does his exercises four or five times. The first week is spent in muscle contractions and after that the active exercises are added, carefully graded so that at no time does the leg get over-tired. These exercises should not take over eight minutes at each period. It is far better to exercise for a short period several times a day than to tire the knee out and then let it rest all the rest of the day.

As the circulation and motion improve and lateral mobility decreases, the visits are dropped off to twice a week until the surgeon in charge feels that it is safe to allow weight-bearing without the splint in the house. Then the exercise periods are increased to include walking exercises.

By this time the patient has a well-muscled leg with flexion at least to a right angle, the rest of the motion being gained by daily use.

The secret of successful after care with fender fractures is dependent on:

1. Close cooperation with the surgeon in charge of the case who has to constantly test for lateral mobility, and see that the plate is giving enough pressure.

2. Absolute understanding on the part of the patient that the responsibility of the final result now rests with him and that the offices of the Doctor and Physiotherapist are not places of magic which will make this knee bend while he sits at home waiting until it is time to make the next visit, but rather that he must work at home and work hard, reporting his progress and getting all the help and hints that will make it easier for him to get his motion and ultimately go back to his work with a serviceable knee.

Boston, Mass.

The Treatment of Disabilities Resulting from Low Back Derangements*

By E. G. Brackett, M.D., Boston, Massachusetts

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The diagnosis of low back derangements is often difficult and it is equally difficult to apply the treatment best adapted to this special group of complex cases. Too much of routine has crept in—too much advocacy of special theories of etiology and of functional pathology,—too much stress on special methods of treatment, conservative or operative. This joint area is a complicated one and the explanation of the causation of many of the symptoms is not yet satisfactory,—as, for instance, the symptom of pain. A number of affections of this area may give similar signs and symptoms. Nor must we forget that important part which the general systemic condition plays in the prominence or the occurrence of the same symptoms or signs, which are met with in a purely mechanical derangement or even a pathological condition.

This subject of low back derangement has had an interesting development and a precocious growth. Although the lesions of the sacro-iliac joint were recognized by early observers, they had not been considered of special importance until about 1912. From this time an interest was awakened in many localities and an opposition in others, but this opposition helped rather than hindered the study of these conditions and with the gradual recognition of the frequency of lesions of this special area came the realization of their importance. In the early period it seemed that the affections of this part of the spine presented a simple problem,—that of strain of the sacro-iliac joint or sometimes a degree of subluxation—a definite anatomical lesion, with a clear clinical picture and with signs and symptoms indicating diagnosis and treatment. This diagnosis certainly explained many clinical conditions before not understood, removed from the group of tuberculous lesions many cases condemned to long restrictive treatment, and allowed them to return to active life. Little by little, as this group grew in size, the diagnosis became less rather than more sure, the problem of differentiation and of decision as to diagnosis and treatment correspondingly difficult. The part played by possible derangements other than of the sacro-iliac joint in this localized area was evident, for the lumbosacral and the sacro-iliac joints, so closely placed anatomically, bear together the stress that comes to this part of the spine. With the growing recognition of the importance played by the lumbosacral joint, the differential diagnosis of derangements of this joint and of the sacro-iliac joint became more difficult, particularly since there are no pathognomonic symptoms of the various types of derangements of this region, either as to character or location of the lesion.

Eliminating the cases with actual pathology and the cases of muscle or muscle-attachment strain, there exists a very large class of pure joint cases which, because of the unusual formation and relation of this group of joints, are to be regarded as having a special clinical entity and which, because of their intimate anatomy and function, must be considered together with reference to the influence that a derangement of one may have on the other. The large group of these non-pathological cases classed under the term "derangement" must be considered under the general head of joint strain—with or without a slight degree of displacement. Many of the pathological affections give much the same evidence as do the cases of pure derangements, but the recognition and treatment of these pathological conditions of this area are comparatively simple, for the x-ray corroborates the clinical evidence, and makes clear the nature of the affection, which then can be treated by the accepted and established methods. It is intended in this communication to consider the cases of derangement only, eliminating those cases which show definite pathological lesions.

Cases Presenting a Normal Anatomical Structure

In dealing with cases of normal anatomical structure and relations, the therapeutic problem is that of ordinary strains such as would involve any joint, except that they involve a complicated joint group. The principle of treatment is the same as with other joints, applied with the recognition of the peculiarities of this complicated area, and should have the same consideration. In the past, while these derangements were becoming more understood, one great difficulty arose from the fact that they were regarded as some unusual form of strain, occasioned by a peculiar trauma, and at the same time the special influence of an atypical architecture of this joint group area was not given sufficient recognition. The ordinary joint strain has the potentiality for repair in a reasonable time, which improper or delayed treatment may retard or prevent. However, if these normal joints, the seat of strains, are given early treatment in accordance with the recognized methods,—rest, physiotherapy, fixation, and protection during convalescence—the same result is to be expected. Unfortunately, this frequently is not given, or not applied until after the disability has persisted and become semichronic, at which period the treatment must necessarily be modified.

Cases With Abnormal Joints

With abnormally formed joints, joints which show an atypical architecture, the problem becomes different and demands a modification of the prognosis and of the usual methods of that treatment which is ordinarily directed to normal joints. It can be considered that the

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presence of the anatomical variations of the low back influences the problem of derangement of this area as an added potentiality of occurrence from the usual traumas experienced by the spine, and an obstacle which may retard the progress of recovery.

In the presence of an atypical structure, the essential question is whether such variation is a defect in architecture, introducing into the picture a potential or an actual weakness, or whether it is simply a variation in architecture. A departure from the usual is not necessarily a defect and does not necessarily carry with it an inherent weakness; therefore, to properly understand each case in order to direct the proper treatment, it should be immediately determined whether or not an atypical architecture is present.

Much has been written of the diagnosis, treatment, *et cetera*, of the non-pathological affections in this region, of the importance of these anatomical variations, and of the part they play in the etiology, prognosis, and treatment of these cases of derangement. These variations are exciting additional interest at this time, in part because of the bearing they may have on the problem of industrial injuries. The importance of the rôle which these variations play is yet a disputed question, and although so well recognized, still merits discussion. They may be grouped for this study of the low spine derangements as follows:

Character of Lesion		*Character of Spine*		*Location*
Strain: Acute, Chronic	in	Normal anatomical spines	involving	Lumbosacral joint
		Spines with anatomical variations: Sacralized fifth lumbar; Horizontal sacrum; Imperfect articular facets; Imperfect laminae		Sacro-iliac joint
Luxation (subluxation)		Pathological conditions of the spine: Tuberculosis; Arthritis; Osteo-arthritis		Both the lumbosacral and sacro-iliac joints

In this discussion there will be considered only that group of cases in which this area is the seat of joint strain without a persisting subluxation, and those spines presenting some form of atypical structure; and they will be considered especially with reference to the involvement of the sacro-iliac or lumbosacral joint, or these three joints as a group.

The three well recognized anatomical variations in structure are: (1) the sacralized fifth lumbar vertebra; (2) the horizontal sacrum; (3) the irregular and asymmetrical lumbosacral articulation, with the defects of the laminae which so frequently are associated with this condition. Clinically, the cases do not present signs or symptoms by which these anatomical defects can be satisfactorily detected, or sometimes even suspected, certainly not differentiated; only by the x-ray may the presence of these variations be established, but the importance of their influence on the prognosis and treatment cannot be disregarded. It is only by taking the types of architecture into consideration that the cases presenting themselves as derangements may be differentiated into their proper etiological groups, and the prognosis and treatment determined with these important influential factors in view.

(1) *Sacralized Fifth Lumbar Vertebra*

Since attention was first called to this variation, there has been much controversy as to its importance and as to the part it plays in the development of low back derangements. It is not necessary to describe the different forms of this anatomical type, familiar to all who are dealing with this problem,—they vary in the extent and firmness of attachment to the sacrum or ilium, and in the resulting solidity. One must distinguish between the enlargement of the transverse process with impingement on but with no actual articulation with the ilium, and the true sacralization with a true articular junction; and also between the unilateral and bilateral forms. Except that in the unilateral the firmer attachment of the sacralized process upon one side gives a lesser mobility or an added strength of attachment, the influence of this anatomical variation is undoubtedly very slight and rarely is an injurious factor. In the bilateral, the added articular areas result in a greater immobility of the junction,—but this loss of motion is easily compensated by the remainder of the lumbar region. In general, this anomaly is an element of added strength rather than weakness, and is not to be regarded as having the same importance as the anomalous variations which produce actual defects and which introduce a positive factor of weakness. The claim of added strain to the opposite side, in the unilateral forms, because of the firmer fixation on the side of the sacralized process, is mainly theoretical, for the remarkable mobility in the remainder of the lumbar spine easily compensates for the restriction occasioned by the sacralization. Of the different anatomical variations which are found in this part of the spine, this undoubtedly has the least influence in favoring the occurrence of or delaying the recovery from the usual derangements, and is of itself the least important. Much has been written on this subject, and of the rôle that this anatomical structure plays in the causation of strain, *et cetera*, but the consensus of opinion is very largely in favor of the view that its influence is negligible.

The derangements associated with the sacralized lumbar vertebra are similar in character to those met with in the normal spine, and the problem of their treatment is practically the same as with a low spine of normal anatomical structure. There is no tendency, because of an imperfect architecture, toward displacement or change of relation of the joints which comprise this group, and the possible unequal leverage, emphasized by some writers, is certainly not demonstrable and does not tally with clinical experience.

(2) *Horizontally Placed Sacrum*

With the normal degree of inclination of the sacrum, and normal angle of junction with the lumbar spine (160 to 140 degrees), the superencumbent weight falls to a firm and secure supporting base, with a minimum tendency of exaggeration of this angle and a minimum tendency of the fifth lumbar body to sheer forward on the sacral segment. The sacrum is described as having a forward rotation movement on an axis posterior to the body of the second lumbar vertebra,—the upper part of the sacrum tending to move forward and downward in response to the thrust of the superencumbent weight. In the normal angle this stress has a minimum of displacement force.

Fully as important is the relation of the sacrum in its attachment to the ilium. The ilium is hinged, as it were, to the sacrum on the horizontal axis by its attachment at the sacro-iliac joint, and this hinge forms a part of the supporting column, through which the superencumbent weight is ordinarily transmitted downward through these underlying sacro-iliac joints. The usual strain, therefore, in resisting the superencumbent weight is transmitted through a nearly vertical column, and is slight because of the minimum of the displacing force. However, with a change in angle, resulting in the forward inclination of the upper sacrum, such as exists in the horizontal type, and since, because of the displace-

ment, the line of gravity is anterior to this sacro-iliac hinge, this tendency to the forward and downward thrust of the fifth lumbar vertebra is greatly exaggerated with the increased rotating force on the sacro-iliac joints. There results, therefore, an added force, exerting an abnormal strain on both joints in this group, of the character of a stress, to resist which their structure is not designed. In this respect the exaggerated angulation of the sacrum presents an actual defect of structure, and therefore an element of potential weakness, because of the forward and downward thrust of the upper part of the sacrum, which results from this displacing force. The resistance to this displacement of the sacrum must be met by the sacro-iliac joints, and in a position in which they are acting to a disadvantage. The weakness from this fault in architecture must be compensated by the additional ligamentous stress to resist a resulting twisting strain on a spine, not provided for by its anatomical structure.

Although this structure is entirely compatible with even an unusual physical activity, the horizontal sacrum has a two-fold injurious influence: (1) the anterior sheering force, as a consequence of the obliquity of the sacral segment in resisting the superencumbent weight, with the resulting tendency in yielding to the forward movement of the fifth lumbar vertebra toward a spondylolisthesis; and (2), most important, the twisting leverage force on the sacro-iliac joint, resulting from the forward and downward rotating motion of the upper end of the sacrum when the superencumbent weight falls forward of this joint instead of passing through it. This exerts a force which these joints are not constructed to withstand. The clinical significance of this potential weakness lies in the fact that this forward inclination of the sacrum allows more easily the strain to be directed toward the sacro-iliac joints, which retards recovery, and renders these two joints more vulnerable to repeated strains, and thus it transmits the stress to the other joints in this area.

This is not to be confused with true spondylolisthesis, which is so often associated with this horizontal position of the sacrum, particularly when combined with imperfect articular processes, and defective laminae of the fifth lumbar vertebra.

(3) *The Irregular and Asymmetrical Lumbosacral Articulation*

The atypical lumbosacral articulation introduces a factor which always demands attention. The different variations have been fully described, and their types are well understood and need no elaboration. Differing from the other atypical structures, they always represent a departure from the normal or the usual, which is in some degree a defect in architecture, therefore a positive factor of weakness.

So frequently associated with these defects of this articulation are structural defects of the laminae, the importance of which is not in this lack of fusion of the laminae, but rather in the accompanying imperfect development of other parts of the neural arch not usually demonstrable by the x-ray. These defects frequently involve the articular facets, and also the supporting part of the lamina which forms their base. The defects of this area are seldom found isolated, but associated in different relations and degrees, and are particularly important because of the frequency of the imperfect development of the neural arch. The clinical importance of all, particularly when asymmetrical—which is usually the case—is in the diminished resistance to the superencumbent weight against the sheering forward to one side of the fifth lumbar vetebra,—a force which tends toward a rotation of the body, which in turn disturbs its relation to the supporting base. The importance of this yielding is in the rotation force which it transmits to the supporting sacrum, and which must be resisted by the sacro-iliac joints which hold it in position. This fact illustrates the principle that a yielding in one portion of this group results in an additional strain to be resisted by another joint of the group, and of a character and in a direction not usual to it.

Moreover, when this is associated with the horizontal sacrum, with its tendency to a forward and downward tilt, the result is an added twisting force on the sacro-iliac joint. Always in this lumbosacral junction is the tendency to forward displacement, against which the normal structure offers a strong and sufficient resistance. But, with the introduction either of a less perfect contour of articulation, or of the abnormal horizontal sacrum, or of both, there is added a potential toward an actual displacement, with the added ligamentous strain necessary to compensate the bony defect. When unilateral, as is ordinarily the case, this introduces the rotation element between the fifth lumbar vertebra and first sacral segment, and this displacement must be resisted by the supporting sacro-iliac joints below. Again it is seen that the stress cannot be confined to one joint, but must necessarily be shared by those entering into this joint group.

In our present position, with accumulated experience of the few past years, recognizing its complicated clinical manifestations, the persistency of the symptoms and disability, it is necessary for us to look on this problem from a broad point of view, in order to estimate to what extent the majority of these cases are an affection of this joint group collectively, and how much they are an involvement of one joint alone.

Too much have these cases been regarded as a result of localized trauma, with closely defined identity, often as the strain of a special ligament or muscle attachment, with particular means of treatment directed to isolated and closely localized derangements. Even if these do exist as individual affections,—as is probably sometimes the case—it is a question whether it is possible to accurately diagnose or differentiate them, much less to apply special or specially directed treatment. At least in the vast majority of cases we are dealing with the complex result of a trauma, expended on a complicated joint area, which entire area much receive the stress, even if not yielding to it as a whole.

Certain facts must be taken into consideration. The problem is with a group of three joints, which, because of their close anatomical relation and common function, must be considered collectively and with reference to their inter-relation. Anatomically they are constructed to bear the same load, to distribute the stress more or less equally, and together they bear the shock. Functionally their work is the same,—to resist together and at the same time the great strain to which this special region is subjected, and which may come from any direction, since the strain which must be transmitted through this area must be borne by them all.

There is but little motion in two of these three joints, although sufficient to resist the usual stress or shock, which is transmitted from one to the others, and in which all participate. Because of the fact that in the two sacro-iliac joints the motion is slight, the capacity for resistance is less. They have in common ligaments to restrain the motion within the normal arc. Trauma exerted on one of these also must necessarily give stress to the others, even if not with injurious results. Yet repeated stress will tend toward a gradual yielding and the development of chronic derangement.

In the normal architecture their anatomical relations are such that the line of gravity coincides closely with

their anatomical relations, and therefore the stress is borne with a minimum of mechanical strain,—*i.e.*, the architecture of the normal is sound, and constructed to bear the stress. On the other hand, with abnormal architecture the defect in structure introduces a loss in resisting strength, and since there is so slight a degree of motion—for the "take up"—all three of these joints must share in the stress. Particularly is the stress on the lumbosacral joint borne by either or both of the sacro-iliac joints, because of the leverage of the upper portion of the sacrum above its small attachment to the ilium.

The problem of diagnosis, with then the subsequent prognosis and treatment, is not simply that of the diagnosis of the presence of a sacro-iliac or lumbosacral derangement. It should go further than this,—to determine, first, whether the derangement of this low spinal area is in a joint group of a normal structure or in a joint group possessing structural defects and with, therefore, a potentiality of incapacity; and, second, when an atypical structure is present, to what extent it exerts an influence on the incapacity of the whole of this group and may modify unfavorably the prognosis and treatment. Particularly in the lumbosacral joints the ligaments will yield, and leave a permanent residue of motion or laxity and a vulnerable joint. And, third, particularly is it essential, in this stage of our knowledge of the problem, to study each case from all angles, especially keeping in mind the fact that we are dealing not with the problem of an individual joint but with a group of joints, intimately related, anatomically and functionally, bearing the same stress, sharing the same strain, and frequently yielding as a group rather than individually; and which may, and often do, share in the involvement of the lesion. This is especially essential to keep in mind, since the two sets of joints comprising the group may produce signs and symptoms in common, and there is so much overlapping of evidence with the derangements of this area, that the prognosis and treatment must be based on this consideration of the close anatomical formation and the intimate functional character of this peculiar region, as well as of the cooperative manner in which each joint must resist the strains which come to this region as a whole.

Physiotherapy Treatment in Certain Types of Low Back Strain

By Mary McMillan

From Dr. Brackett's article, "The Treatment of Disabilities Resulting from Low Back Derangements," I should like to specify the types of which he describes as those presenting a normal anatomic structure suffering from joint strain either acute or chronic; this does not include those cases that are of pathologic origin.

In considering physiotherapy treatment for the conditions above mentioned too much emphasis cannot be stressed upon rest, especially in the acute stage, also fixation and protection against further possible strain; as this is in the hands of the doctor in charge it will not be discussed here.

The position of greatest ease for the patient which necessarily implies the greatest relaxation is of importance during the treatment. The patient may lie on the unaffected side with a small pillow placed under the head, the knees slightly flexed or, if the person can easily assume it, the prone lying position is a good one. A small pillow should be placed beneath the abdomen; this supports the trunk so that too great a strain is not placed on the lumbar spine.

At all times the patient should be advised to avoid lying on any surface that allows the lumbar spine to hollow in too much, a firm straight mattress during the hours of sleep may make a great deal of difference regarding the comfort of the patient.

Heat in any form preceding massage is always indicated. A good hyperaemia may be attained by various methods: hot fomentation, infra-red lamp, baking or diathermy. Where pain is evident a good old fashioned hot pack is often very soothing. A flannel strip placed between a bath towel, the ends of which are used as handles and kept dry, is tightly wrung out of water around 180° Fahrenheit. The hot flannel is placed over the low back and covered with a heavy piece of dry flannel. Two sets of flannel are used in order that no waiting between hot packs is necessary. Each pack is kept on for a few minutes and is replaced before it is allowed to feel cool to the patient. This is repeated from one to five times.

If the infra-red lamp or a baker is used, fifteen to twenty minutes of exposure of the lumbar region is given. The time is measured according to the skin reaction.

If diathermy is the form of heat used, give from thirty to forty minutes of the d'Arsonval current. The patient lies in the prone position, the larger of the two metal electrodes placed beneath the abdomen and connected with the high frequency machine. The smaller electrode is usually cut the size of the affected area and placed directly over it and kept in position by means of a sand bag in order to get good contact. The milliamperage varies according to the size of the smaller electrode. It is a safe guide to use 100 milliampers of current for each square inch of the smaller electrode. It is imperative to have good contact between the electrode and the skin throughout the treatment in order that there may be no fear of burning the patient.

Following the heating process, it is well to give long, rhythmic stroking of the back and deeep kneading of the muscles of the back and glutei muscles. In the acute stage, sensitive spots should be avoided; later, they may be cautiously kneaded and stroked, providing that the sensitivity is lessened. The muscles of the thigh on the affected side should be stroked and kneaded because not infrequently these muscles suffer from tension owing to their having the same nerve distribution. It is not at all uncommon for the muscles of the foot supplied by the terminals of the sciatic nerve to have occasional spasms, in which case the foot and leg on the affected side should be stroked and kneaded.

Should the patient be going out into a cold temperature, it is well to rub the heated area lightly with alcohol; this will close the pores and so prevent the patient from taking cold. To encourage a healthy reaction following the application of external heat a cold sponge or cold spray is good.

Exercise of any kind should be avoided in acute conditions until all fear of recurring inflammation or irritation is over; later, active gluteal contraction is one of the easiest forms of exercise for the patient, although sometimes it takes a good deal of patient teaching on the part of the operator to teach the patient to segregate any group of muscles for active muscular contraction.

In the chronic cases, passive and active exercises can follow massage from the beginning, gluteal contraction, passive hyperextension of hip from the prone lying position, later active hyperextension from the standing position can be used. Active raising of the head and shoulders will contract the extensors of the back and bring into play the lumbar and glutei group; it is advisable to place a small pillow under the abdomen during the head raising exercise from the prone lying position.

Another active exercise to strengthen the lower back muscles is to have the patient from the upright standing position stoop forward from the hip to a 45° angle and slowly return to the upright position; the patient can grasp some steady object which he faces during this exercise. Hyperextension of the hip from the same upright position will help to strengthen the lower back muscles; the patient should grasp a steady object while doing this active exercise.

Boston, Mass.

The Value and Use of an Exercise Pool

By Janet Boyd Merrill

One of the forms of Physical Therapeutic treatment which is receiving much attention at the present time, is that of giving therapeutic exercises or localized muscle training, in what is commonly spoken of as a swimming pool. In fact there is so much popular and professional interest now in the treatment of Infantile Paralysis in pools, that there seems danger of a feeling that no place is able to care adequately for such patients unless a pool is included in its equipment, and conversely that it is only necessary to raise the money to get any patient to such a place to insure his complete recovery.

This article is not written in any attempt to disparage the use or the value of an exercise pool, for we are very enthusiastic about the one recently given to the Children's Hospital and had been convinced for several years previously that certain types of the more severely paralyzed patients, and certain muscle groups, improved more quickly and perhaps to a greater extent when given treatment in water, than when this was not available. On the other hand, we believe that some other infantile paralysis patients receive very little, if any, additional therapeutic value from an exercise pool, over what they would receive from skilled muscle training given in their own homes or at a clinic. Insufficient attention seems to have been given to this aspect of the problem, as well as to the differences in equipment and construction necessary to make a swimming pool suitable for therapeutic work.

The theory and, to a limited extent, the practice of giving exercises in water is not new, but until recently adequate facilities for carrying them out were not available. In the first edition of Dr. R. W. Lovett's textbook on the treatment of Infantile Paralysis, issued in 1916, he says that the warm bath is generally of benefit because the buoyancy of water diminishes the weight of the limbs, and permits motion which is not possible out of water, because the limbs are thus supported. At that time some of his more severely paralyzed patients were given their muscle training in their bath tubs, salt being added to increase the specific gravity and buoyancy of the water. The size of the tubs limited the choice of exercises to a considerable extent and the strain on the instructor's back, due to the location of the average tub, usually resulted in the progression of the patient to table exercises as soon as his muscles were able to function out of water. Many of the specially built tubs and pools today are the result of the additional function or power which was felt by a patient of Dr. Lovett's, a college student fond of swimming, who attributed much of her progress to her habit of carrying out her exercises in the water. Her enthusiasm has resulted in the gift of specially built tubs to various schools and hospitals, and their use has stimulated the building of larger pools for the more adequate treatment of larger numbers.

The cases of Infantile Paralysis which have received treatment in the Children's Hospital exercise pool during the past ten months, have been chosen for the most part on account of the severity of their paralysis, and so are not a favorable group from which to obtain statistics of marvelous recoveries due to this treatment. On the other hand they were the cases which needed every possible aid. They fall into two groups:

I. Chronic patients who had been carrying on the regular routine of home muscle training and massage under clinic supervision. These were given a period of pool treatment during the summer months to see if it would act as a stimulation to further or more rapid return of power in those muscles which were capable of some function. In spite of the occasional authentic reports of a slight return of function in muscles which have remained completely paralyzed under several years treatment, the percentage is too small to warrant expectations of any appreciable progress in that direction, and no instances were noted among this group. Muscles able to perform some function, but unable to raise the weight of the part against gravity, which we classify arbitrarily as "poor," did not gain in power to the extent of being raised to the next grade of "fair," which assumes an ability to function against gravity outside the water. In reply to this, it may be said that these muscles are slow to change and also that there may be quite a variation in power between a muscle which can barely produce a few degrees of motion in the most favorable position, and one that can complete the arc of motion normal to it against some outside resistance, but is still graded as "poor" because it cannot raise the weight of the part against gravity. Miss Kent, the instructor who gave these treatments, was questioned about this, as changes of this sort would be evident to her at the time, since she had had previous experience in the treatment of infantile paralysis cases both as a regular clinic worker here, and at the exercise pool of the Gillette State Hospital for crippled children. Her report verified our opinion that there had been very little increase in actual power. A check of reexaminations of these same children made some months after discontinuing the pool work, did not bear out the theory that an additional improvement might be evident later. We have no figures on a group of chronic patients whose treatments in a pool have been carried out with frequency over a long period of time. Sanitariums and schools for crippled children must supply these in any number. However, we have gained a very definite impression that the value to chronic patients over other forms of treatment consists in a gain in the general functional use of the body as shown by ability to swim in some fashion, get over stairs more easily, and overcome that element in the limp or gait which is largely the result of a faulty habit of handling the body, in other words, a

better functional co-ordination of the existing power rather than a relatively greater increase in that power over the amount which would have been gained under routine muscle training during the same period. This statement of course does not take into consideration the other factors of the pleasure which is afforded these patients who are deprived of many of the pleasures of normal children, or of the psychological benefit to the morale of a helpless person who finds himself acquiring a greater degree of independence as well as being able to participate in a sport with others, or of the possible benefit to the general health of a class of children who have been barred from most forms of recreative physical education. Families of chronic patients who are making desperate efforts to obtain pool treatment should have explained to them very clearly that the probable benefits will be along these lines, and not in any marked change in actual power.

II. When it comes to the patients of recent onset, it is very difficult to say in any particular case that its muscles will benefit more from work in the pool than from other forms of treatment, particularly if it can be carried on for only a few months. A preliminary survey of the detailed muscle examinations of the 1930 severely paralyzed patients who have had regular pool treatment, is not encouraging as to actual statistical gain in muscle power. As in the analysis of earlier cases treated in an exercise tub, the neck and trunk muscles show the greatest gain, followed by the deltoid and shoulder muscles, and next the upper leg. Naturally enough, hands and feet show the least gain.

However, it is only fair to say that most of these patients had the most unpromising outlook from the beginning, with severe involvement of the trunk and all four extremities, some of them owing their lives to the artificial respiration machine.

The brighter side of the picture is shown not in statistics, but in function, and function is the final test of the value of any form of therapeutic treatment. Their gain in balance and control from practicing walking and other exercises in water has been carried over into their ability outside, in a most remarkable way. They show no fear on being set on their feet equipped with crutches, corset and walking braces, and gain their tripod balance almost immediately, starting off at once to move their crutches and feet. Those of us who have struggled for days and weeks to get such a patient to maintain his balance and move one leg or one crutch, are thoroughly convinced of the value of this preliminary work in the water. Those who start their walking with less apparatus, are starting with very little body sway, having gained a better balance in the water. We hope that they are escaping some of the distressing hip limps common to their muscle charts.

Another advantage comes from being able to start the muscle training soon after the attack, before all the sensitiveness has disappeared. Free motion is possible at this stage in the warm water without the sensation of pain, and the tenderness seems to disappear more rapidly. Beginning contractures can be more easily done away with then, and the convalescent period is hastened. The mental attitude is also better.

The rate of gain in muscle power in patients with involvement of equal severity has not been found to be strikingly different whether their muscle training has been carried out on land or water.

The treatment routine which we have followed has consisted of a period of about twenty minutes in the pool daily, followed by recumbency in a warm rest room to aid in preventing over-fatigue and colds. The room for out-patients has been equipped with a General Electric sun light bulb to provide a mild ultraviolet exposure, while the ward patients are given regular therapeutic exposures in the carbon light solarium during the winter.

The first part of the twenty minute time is given to regular localized muscle training on the submerged tables, and the last part of the time to the more general functional activities. Learning to float is first given as a preliminary to whichever swimming strokes are best suited to the individual's muscle involvement. Swimming on the back seems generally best suited to the cases with severe shoulder involvement. Walking in water at shoulder depth can be given as an exercise, before it is advisable to allow weight bearing outside of the water, and there is no question that it is a great aid to obtaining balance in the erect position. A corset for the trunk and simple wire leg splints are worn whenever the weight bearing body alignment is faulty.

Climbing the stairs at the deep end, sitting erect for balance, playing games with balls, and more generalized exercises grasping the bar, are also included in this period.

Contractures are stretched in the water, and a point is made of stretching them again outside if they are at all severe. Patients with respiratory involvement and lack of chest expansion are given additional exercises to increase this outside the pool, and care is taken to prevent their swallowing water and choking in the pool. Massage is given when the circulation is especially poor, and also to restore any joint flexibility which may be restricted due to prolonged recumbency in splints. Out-patients come three times a week for pool treatment, and carry on their usual massage and muscle training at home on the alternate days.

CONSTRUCTION AND EQUIPMENT

In planning a therapeutic exercise pool its needs and uses must be kept clearly in mind, for neither the architect nor the swimming pool contractor know these things. One great difference in the use of a therapeutic pool of any size from the use of a swimming pool, is that instructor and patient must be standing on the bottom of the pool for much of the work. Well controlled and localized muscle training cannot be given unless the instructor can reach the patient as easily in the warter as on a gymnasium table, and one of the most valuable factors which pool work offers to badly paralyzed patients is practice in walking in water of shoulder depth.

The length and width will be governed by the number of patients and instructors it is intended to have in the pool at one time, the amount of swimming which is desired, and the question of whether it is to be used also for recreative purposes by normal children. The depth at the shallow and deep ends should be planned for the age or height of the patients to use it, bearing in mind that a small pool of twenty feet in length does not permit much more than a two foot difference in depth between the two ends, without making the pitch or incline of the bottom too great for both the patients walking, and for the instructor's footing. A longer pool of regulation length can have some sort of barrier to mark the limit of the walking area, if a deep end is desired for diving.

The bottom of the pool, in addition to being of a walking depth and suitable grade, must also be made of a rough surfaced material which prevents slipping.

A rough cement serves this purpose, but does not give the appearance of clear transparent water over a light polished tile which we like to see in indoor pools. In the Children's Hospital pool we have used the same non-slip tiling for the bottom and for the floor of the room around the pool. This serves its purpose, and gives a better appearance than cement, but is less easy to keep clean than the polished tiles. This problem of the labor required to scrub the floor of the pool room is a very real factor in a room where attendants, orderlies, parents, visitors, and instructors cross the floor on necessary duties in ordinary shoes. Ambulatory patients always wear special paper scuffs when barefooted, both for cleanliness and to prevent possible skin infections, but a gallery for visitors, and dressing rooms entered from outside the room as well as from the pool side, are as desirable for a therapeutic pool as for any gymnasium.

Shower equipment is a necessary feature of a pool, but when this is to be used for helpless patients, certain provisions must be made. The booth must be large enough to include a bench or table on which the patient can be laid at full length while being given the necessary preliminary of a warm soap scrub by an attendant. It is well to have a mixing valve of the Leonard thermostatic type on the plumbing fixture to prevent any danger of too hot a mixture, and the rubber hose attachment will be found more useful than the overhead spray. Dressing rooms should also be long enough to include a table on which a patient can be laid, and if a trolley track system is to be used to transport helpless patients on a stretcher frame from cubicle to pool, it is well to remember that the usual straight nickel curtain rod across the cubicle door prevents the stretcher from being swung into the cubicle.

We have tried to keep the furnishings or apparatus of our pool as simple as possible, believing that elaborate appliances were unnecessary, so have added no equipment until the need for it has become apparent. The pool is twenty-four feet long by ten feet wide, with a depth of water running from two and one-half feet at the shallow to four and one-half feet at the deep end. While the majority of our children are between three and twelve years, we have also included some up to sixteen years. Our usual routine provides two instructors in the pool, and not more than two or three children at a time. However, the size of the pool would allow two more instructors with patients for localized work, or five or six children able to walk or practice special swimming strokes under supervision.

A flight of tiled steps with hand rail was built into one of the deep corners of the pool, over the protests of casual advisers who visualized them simply as a means of entering the pool. Actually they form one of the most useful methods of assisting a patient with badly paralyzed legs to climb stairs. Everyone with experience treating these patients knows how difficult it is for them to shift a foot on to the next stair, and then to haul the body weight up after it. In the water, buoyancy helps to raise the foot and weight with far less effort, and the supporting knee is helped by the water to hold the weight. Individual steps should not be of usual height, five inches seems an average satisfactory height, and since the higher one climbs, the more of his body is unsupported by water and the harder the task, the steps should be planned to reach out some distance into deep water to give the patient's trunk the support of water for as many steps as possible. Strangely enough, it is harder for some to come down stairs than to go up, so this forms an additional exercise of practical value. We also use the ends of the steps as seats, on which the children sit grasping the rail above, and they do foot, knee and trunk exercises, while water up to their shoulders enables a weak trunk to gain balance.

In speaking of this hand rail which extends under water, and also of the exercise rail which extends around the pool about five inches from the side wall and four inches under water, it should be remembered that brass is not a good metal for pools with chlorine sterilization on account of the discoloration which takes place and can not be removed by polishing. Chromium plates are said to stand this water, but may cause annoyance by reflecting lights. Galvanized iron is serviceable but not pretty, bronze or nickel are also recommended.

Benches or seats of suitable height can also be built into the pool at the shallow end, to permit the wall to form a back support and the feet to rest on the floor, if it is desired to give the space to them, but they are less valuable than stairs if space is limited. Removable wood benches must either be fastened by sockets to the floor, or have weighted legs to prevent the buoyancy of water from making them unsteady.

The same problem is met with the exercise tables which form a most necessary part of the pool equipment. As we desired to have them removable, we devised an arrangement by which the head is supported by two galvanized metal hooks from the exercise rail, and the free end has two metal-pipe legs whose length was carefully measured to allow them to rest steadily on the sloping bottom of the pool. The movement of water due to a continuous flow made it necessary to put weights in the pipe to hold the legs down, and rubber suction cups were placed on the bases to prevent defacing the tile. Built-in sockets would have been possible, but this arrangement seemed simpler and allows moving the tables easily. Cypress wood one and one-half inch thick has been used for the table tops and has caused no trouble. The size of the tables, like any exercise tables, depends on the size of the patients to use them. We have two—five feet by three feet and four feet by two feet—the top of the larger being eleven inches below the surface of the water, and the smaller nine inches below. They stand at a convenient height for the instructor, and can be used for practically any exercise possible on a gymnasium table. Simple galvanized wire frames with a canvas strap have been slipped over the ends of the tables to serve as head rests.

An inclined plinth of wood with shorter pipe legs is also hung from the exercise rail at the deep end, and a removable foot board can be pegged into different holes when it is desired to use this support.

This completes the equipment with the exception of a trolley and hoist. If the pool is to be used for helpless patients of any size, except the smallest, it is almost essential to have some form of hoist for lowering them into the pool and lifting them out afterwards. Even with an orderly, impervious to back strain and constantly on duty, recently paralyzed and sensitive patients cannot be picked up in the arms and handed from one person to another without discomfort or pain. A chain hoist or other arrangement which can be attached to the four corners of the stretcher top of a hospital truck, and by means of a trolley can swing the stretcher between the dressing cubicles, shower and pool, lowering and raising it without great strength or back strain, is a very important part of the equipment. Unfortunately, it is

also an expensive part, even when the smallest stock size built for factories is used.

The trolley can also be used in helping the most severely paralyzed in attempting to regain the upright position; however, we have only found four for whom it has seemed desirable to use the trolley. The others walk in the water without it. These four wear a canvas corset to which are attached the webbing straps which hang from a head sling spreader, which in turn is suspended from a trolley running across the pool on a track which can be slid to any desired depth. Perineal straps may be needed to hold the corset down, and elastic webbing straps may be fastened from the bottom of the corset behind to the tops of the walking splints, to prevent any buckling at the hips. These walking splints are made of light galvanized wire, have a sole plate with a canvas anklet, and a knee cap. They are used on one or both legs whenever the support of muscles and water is insufficient to keep the knee and foot in proper weight bearing alignment. When the trolley suspension is not used, an air-filled rubber frog under the armpits gives sufficient support to the body in the majority of cases, and can soon be discarded. It is also used in the early stages of learning to swim. We have found no objections to its use in a pool of this size, and the children are eager to discard it in order to go alone like the others.

Hospital T binders or loin clothes of unbleached cotton are sufficient bathing suits for children, with rubber caps for hair. Bathing suits, socks and light weight khaki-covered rubber waders are needed for the instructors, with paper slippers for bare feet outside the pool.

Routine precautions include a nose and throat culture, daily inspection for signs of a cold or of a skin infection or rash, and a warm soap scrub before entering the pool. Hospital ward patients also have daily temperature reading, and Wasserman reactions, and for the first ten days after admission, are given their preliminary work in the individual Hubbard tub instead of going in the main pool with the others. In ten months of use we have had no cases of skin infection, one patient with an inflammation in one ear which yielded readily to treatment, and no cases of contagious disease attributed to the pool.

The pool itself has a re-circulation system of continuous flow with triple gravel filters and an orthotolodine system using liquid chlorine. At an average of .3 part per million of residual chlorine, the 24 hour bacteria count made by the hospital laboratory is sterile, and the 48 hour report from the city laboratory runs from 10 to 20 per cc with no colonic bacteria, 500 being the legal allowance. This proportion of chlorine has resulted in no complaints of irritation to the mucous membrane of eyes or mouth, and is considered sufficient to sterilize any dangerous pollution from bathers as well as to disinfect the entire body of water. Alum is also added as needed. In spite of the negative bacteria count, and a statement that once in six months would be often enough, the pool is emptied and scrubbed down about once in six weeks on account of a sediment which discolors the tiles, although Boston water is considered unusually clear. An overflow drain at the top is a help in removing surface dust.

The temperature of the water is kept at about 90 degrees F, and as this is much higher than the usual swimming pool, it presents an additional engineering problem to install a heater which will produce the desired temperature in a reasonable time after refilling, and also on winter mornings when the circulation has been stopped over night. This would be still more of a problem if the pool were to be used for normal children.

While a temperature of 90 degrees is uncomfortably warm for the normal person to exercise in, it should be borne in mind that it is somewhat below neutral or skin temperature, thus causing a loss of body heat. The cold limbs and poor circulation of badly paralyzed patients do not have the quick reaction and extra production of heat with which the normal person responds to a lower temperature, and chilling results with consequent loss of muscular effectiveness. We have complaints of discomfort when the water drops to 88. Even warmer water can be used with cases of spastic paralysis, although we find that a 90-92 temperature aids them in relaxation.

It is not my intention to go into the effects of pool treatment on conditions other than infantile paralysis. The children from the special neurological ward for the study of birth injuries and similar lesions, have three periods a week in the pool, but the fact that their entire day is a period of functional training makes it difficult to estimate what part the water exercises may play in any improvement.

The large number of cases which have been followed by the Harvard Infantile Paralysis Commission, has made it possible for us to know pretty well what results we could obtain by the use of massage and muscle training. So far we have seen nothing to make us feel that a patient cannot be cared for adequately without the use of a pool. However, the severely paralyzed patient can be cared for equally well, with far greater pleasure and stimulus to effort in his treatment, when he can have it in a suitable pool under the direction of an instructor who is expert in the care of infantile paralysis. The average swimming instructor is not familiar with the details necessary to determine which particular muscles are most in need of exercise, or to choose the movements which will bring about the desired result, so not much more than a general feeling of increased well being can be expected to result from visits to the average swimming pool. Much of the benefit attributed by patients to the water at different clinics is undoubtedly due to the psychological effect of working with others in a pleasurable manner, under an environment and routine which prevents fatigue and provides intensive supervision.

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The Importance of Body Mechanics in Physiotherapy

By Leah Thomas

Body Mechanics has had and always will have a place in both medical and educational professions. Unfortunately, at the present time, in these two fields, the teaching of Body Mechanics stands in a confused mixture of medical and educational theories. If these medical and educational theories could be more closely corelated or made entirely separate each side would be strengthened. One solution of the problem from each of you may give more inspiration and practical help than any one of us has been able to contribute alone in the past.

THE GROWTH OF BODY MECHANICS IN THE MEDICAL WORLD

A small section of the White House Conference—Sub Committee on Body Mechanics—will give the wide scope of interest shown by the medical profession. The program of this committee in brief is as follows:

"In studying the present status of the health and well-being of children, the relation of body mechanics and posture to that health and well-being should be investigated.

I. DEFINITION OF THE TERMS, "BODY MECHANICS" AND "POSTURE"

The Committee recommends that the term "Body Mechanics" be employed by this Conference whenever possible in place of the term, "posture," as being more inclusive and descriptive.

Definition: Body Mechanics is the mechanical correlation of the various systems of the body with special reference to the skeletal, muscular and visceral systems. Normal body mechanics obtains when this mechanical correlation is most favorable to the function of these systems.

II. SCOPE OF INVESTIGATION

A. To investigate what is being taught as to Body Mechanics in: 1.—The medical schools. 2.—The schools of physical education. 3.—The public, parochial and private schools. 4.—The hospitals and health centers in the United States. 5.—The schools of nursing. 6.—The homes of the children.

B. To determine: 1.—How much should a medical student be taught of Body Mechanics and in what departments should this instruction be given? 2.—How much should a student in a school of physical education be taught of Body Mechanics? 3.—How much should a student in the public normal schools be taught of Body Mechanics? 4.—How much should a school child be taught of Body Mechanics? 5.—How much should a nurse be taught of Body Mechanics? 6.—How much should a parent be taught of Body Mechanics?

C. To collect and analyze statistics as to the incidence of poor Body Mechanics among children in: 1.—The city schools. 2.—The rural schools. 3.—How should these statistics be collected? 4.—What should be the scope of the investigation?

The purpose of such investigation is to throw light upon the cause of poor Body Mechanics and its relation to the health and well-being of children.

D. To analyze the knowledge already acquired and to be acquired, with a view to ascertaining the answer to such questions as the following: 1.—Should exercises in Body Mechanics be made an integral part of, or substituted for, the regular school physical exercises designated as calesthenics? 2.—If so, at what age and in what grade should this instruction in Body Mechanics begin? 3.—How long during the school course should this instruction continue? 4.—By whom should this instruction be given? 5.—What amount of time is required to instruct the average child in order to make it possible for him to acquire the habit of good Body Mechanics? 6.—What should be recommended for the child needing more detailed instruction in Body Mechanics?

E. To develop a systematic plan for the carrying out of approved methods of instruction in Body Mechanics, necessary medical supervision, qualifications of lay personnel, etc.: 1.—In medical schools and schools of physical education. 2.—In public, parochial and private schools. 3.—In hospitals, health centers and the home.

F. To report what is at present being done and what has been accomplished by the various agencies at present dealing with the subject.

In order to fulfill the demands of this program, information was sought by means of questionnaires and personal investigation. The committee sought to present facts and figures rather than theories, but they also attempted to interpret these facts and figures. Some of the evidence is based on clinical experience and lacks scientific "laboratory" confirmation, but is yet worthy of presentation, if the committee, sensitive to this lack, has judicially evaluated this evidence.

At the White House Conference a three hour discussion of the above outline was carried on by leading Pediatricians and Orthopedic Surgeons. Their enthusiasm, their wide viewpoints and vision, their future plans for progress and development, their far-reaching effort to cover the present need of instruction in Body Mechanics for children of all ages, gives you, as physiotherapists, an assurance that the medical world is full of opportunities for important research along this line.

THE GROWTH OF BODY MECHANICS IN THE PHYSICAL EDUCATION WORLD

In the educational world one cannot feel so certain of the ground on which he stands. It is here that the physiotherapist can help if a few of the difficulties are to be made clear.

These days the *method* of *teaching* is considered by many educators to be more important than the subject matter. They feel the student must enjoy himself, the student must gain knowledge or skill, the student must feel a certain satisfaction from the lesson learned. There are many supervisors of Departments of Physical Education who, for some reason, feel that the present methods of teaching Body Mechanics do not meet these requirements. A health supervisor from a large univer-

sity in New York City once said that he believed the principles of Body Mechanics were sound and true but he did not approve the way they were being taught. This statement was made ten years ago and to this day he has not found a method sufficiently satisfactory to himself to give this subject to his students who are preparing to be Physical Educators.

Would you not be surprised some morning if the doctor at your office greeted you, instead of the usual "good-morning" with, "how do you know body mechanics are important?" Those are the exact words of a "good-morning" which greeted me not more than two years ago. Time was limited for an adequate explanation and my only disgusted and discouraged reply was "how does anybody know anything?"

At a recent meeting in New York a speaker from the Bureau of Education, Washington, D. C., stated that he believed we should not only stop trying to correct and prevent tendencies toward so-called abnormal growth, but also should stop talking about it. His only justification for teaching corrective gymnastics and body mechanics was in case one could find nothing else to do. He showed actual statistics of thousands of children, medically examined twice a year and postures marked according to rule. At the end of one or two years practically none of these children had improved his posture. If two thousand children were taught reading and at the end of a year not one child could read, would it prove that it is a useless attempt to teach children to read? I fear the responsibility would fall more heavily on the instructor than the pupils. I mention this here only because the speaker read a similar paper at the Physical Education Convention last year where too many Physical Educators welcome encouragement to pass lightly over the subject of Body Mechanics.

At a large Western University swimming is emphasized as an important corrective measure. I feel that rhythmic and natural dancing with the constant upward stretching from tiptoes should improve posture. It seems as if horseback riding must help considerably; and what of archery which immediately brings to mind the ease and grace of the perfect or A posture? Physical Educators have a right to claim that they are improving postures indirectly through activities and sports. This actual improvement in posture through any one of the above activities is not great enough however to raise the posture of the majority of students to a standard of which they should be proud or from which they could receive increased health and efficiency. It is not too much to expect every child with eight years of physical education in grammar school, four years in high school and two years in college to have acquired habits of posture higher in standard than the present systems of physical education are bringing about. Statistics from several sections of the country agree that the average is "C" with many more "D's" than "A's".

It would not be wise or fair to close this paper without finding encouragement in the high spots of excellent work which cannot be overlooked. No city in the country has all its public schools so well organized for this work as Los Angeles. Every year thousands of children who are below a certain standard of health are receiving special care with emphasis along the line of corrective exercise and Body Mechanics. This work was organized and is now being carried on by a doctor. The many trained instructors and supervisors in his clinics are physical educators with years of experience and study and interests tending toward the medical world rather than the educational.

Other public school systems may be undertaking a similar plan. I venture to say if you can think of such a one the directing of this work will fall in the hands of a doctor or physiotherapist.

Dr. James Rogers believes that any form of medical or corrective work should not fall under an educational program and that these two cannot by any stretch of the imagination be combined. There may be truth in this statement.

A few years ago the grade teachers in New York City had special classes to learn the principles of Body Mechanics. They were given teaching material for the different grades with suggestions to interest the children in group instruction. The school authorities did not turn to a physical director to guide and lay plans for these grade teachers, but to a person who was recognized by the country at large as a leading authority in a field more closely associated with the medical world than with physical education.

Private and preparatory schools try to be interested in this field but very few schools emphasize the work sufficiently to bring about telling results. Usually in these schools the physical directors' interests must be divided between sports, gymnastics, dancing, the yearly demonstration, and the recreational side of physical education. All these have their approved place in the scheme of things but never to the neglect of the fundamental teaching of Body Mechanics.

Most colleges and universities cling to the long standing special or corrective departments where students not able to take more active work come for exercises adapted to a special need. College work is far from our scope under consideration. The students are practically adults, their growing years are almost over.

The greatest encouragement I can find is the growing popularity and interest in physiotherapy in a few physical education schools where, for one or two years, students are allowed to devote most of their time to studies closely related to this subject. Many of these students think they are interested in it and if they have an opportunity to be associated with doctors and their interests in the medical world is strong enough to make them study the problems of the pediatrician and orthopedic doctors, they eventualy find their place in physiotherapy. If they do not study and are not associated with doctors for the first few years after graduation, the majority again turn their interests to physical education.

For a program which aims to prevent rather than cure, instruction should begin in the lowest grades. Learning correct Body Mechanics is a skill to be mastered and has educational value the same as acquired skill in throwing a ball or more advanced activities. This instruction will have to be given to groups in the classrooms or gymnasiums of our public schools if we meet the immediate need for Body Mechanics. The question is *how* to present the subject to make it interesting and a lasting every day practice of every child.

Does this teaching of Body Mechanics belong to physical educators or physiotherapists? Could either one of these fields work more effectively alone than they do now in a somewhat confused mixture of medical and educational theories? Can the physiotherapists, with medical knowledge and experience, bring to the physical educator the importance of this work plus an overwhelming enthusiasm to have all children benefit by it? Can the physical educators, with multitudes of teaching theories, help the physiotherapists reach more children than is possible through their present methods? Are the

physical educators and physiotherapists together willing to make a plan to divide or unite these two fields in such a way that the teaching of Body Mechanics may be a more vital growing thing?

CONCLUSIONS

1. The physiotherapists, through training and close association with the medical world, fully appreciate the importance of body mechanics.
2. The Physical Directors, as a whole, are more skeptical about this importance and in their eyes so great looms the importance of the methods of teaching that they seem too willing to drop a subject which fits with difficulty into their pattern.
3. If we can hope and expect the teaching of Body Mechanics to grow as rapidly as it should in the field of physical education, the physiotherapists will have to make so clear its importance that more educators will be interested in finding adequate teaching methods of their own.

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The Individual Exercise Class in a Young Women's Christian Association

By Constance K. Greene

The Individual Exercise Class forms an important part in the present day Health Education Department of a Young Women's Christian Association. In this type of class, exercises are chosen to meet the need of the individual; so there is a wide variation from a few simple exercises for the delicate woman who needs to increase her strength gradually, to a strenuous program for the perfectly healthy woman who wants to keep in trim. Many women who work under high nervous tension all day, find rest and relaxation in following a well-chosen exercise program at their own rhythm and without the necessity of "keeping up" with a large class. Although eight or ten may be working in a group, each will be following her own program independently of the others. Each applicant for these classes is given a careful medical examination by a physician who is familiar with the class work. If she is accepted, she is the given a posture and foot examination by the instructor in charge of the class. From these records, her exercise list is made out.

Classes meeting in the morning are largely composed of women who are at home, and who may or may not be in the habit of doing their own house work. They enter the class for various reasons; some of the most common being constipation, faulty posture, weak feet, and the desire to keep in as good trim as their children. Evening classes are composed of business, industrial, and professional women, who elect this work for quite similar reasons, and particularly because they realize the need of counteracting their sedentary habits. Children's classes are also given. These children usually need posture correction. Of course, people are not admitted to the class who have structural faults or who have other conditions which need the care of a physician or surgeon.

Perhaps the simplest way to explain the type of exercise that I have used in these classes would be to outline the program for a few cases. Case A. Young woman twenty-three years of age, history of arthritis from which she had recovered. (Sent in by her doctor.) Delicate, underweight, and easily tired.

Rest in hyperextension position four times each day. (Lying on back with pillow under shoulder blades.)

Exercises: 1. Lying with knees bent: Pelvic tilt, flattening back, emphasizing the contraction of the lower abdominals and the gluteals. Hold. Relax. 5 times.

2. Lying with hands resting easily on top of head: Stretch R arm along floor over head, lifting ribs on that side. Relax. Same to left. (Stretch as a cat does when it gets up after sleeping.) 3 times each side.

3. Lying with hands under neck and knees bent: Extend R leg upward, let slowly sink to floor, keeping back flat and lower abdominals contracted. Bend R knee. Extend L leg and continue. 3 times each side.

4. Lying with hands on lower ribs: Breathe in, expanding lower chest and spreading subcostal angle as widely as possible. Breathe out. 6 times.

5. Lying face down, hands in upward bend position: Raise head from floor, adducting scapulae. Keep chin in. Do not increase lumbar curve very much. Relax. 3 times.

This is a beginning program. The number of times each exercise is done is gradually increased as the strength of the patient permits. Later more exercises and more strenuous exercises are added.

Case B. Young woman of twenty-five, flabby musculature, (especially of abdomen and feet), ptosis. The beginning program for this case was very similar to that of case A, but her progression was fairly rapid as her general condition was good. At the end of a thirty week course, she was able to carry a strenuous program without fatigue. This I will list below.

1. Stride standing with arms in upward bend position: Touch opposite hand and foot with trunk bending forward downward. Alternate with arm stretching upward. Continue rhythmically. (Emphasis is placed good erect posture with contraction of abdominal muscles, during the arm stretching upward) 10 times.

2. Lying with knees bent: Three count breathing. (Ct. 1. Breathe in, forcing diaphragm down and abdominal wall out; Ct. 2. Contract abdominal muscles and expand chest as much as possible; Ct. 3. Breathe out.) 8 times.

3. One-half prone lying on plinth (Legs supported on plinth, trunk inclined toward floor): Raise trunk to horizontal with hands behind head. Return. 8 times.

4. Sitting on bench: Foot Exercise, picking up corks with toes and placing in box to left of R foot and to right of L foot, with supination and adduction of foot. 20 times each foot.

5. Side lying: Scissors (Swing extended legs back and forth from the hips as in the crawl kick, rhythmically). To be done on both sides. 50 counts.

6. Lying with knees bent: Bend knees to chest, extend upward, turn soles of feet toward each other, curling toes and stretching heel cord. Relax feet, bend knees, let feet return to floor, keeping abdominal muscles contracted and back flat. 8 times.

7. Standing at wall, heels three inches from wall, hips, shoulders, and head touching wall: Contract abdominal muscles, gluteal muscles, and make lower back touch wall. 8 times.

8. Shoulder stand: Alternate knee bending. (The body weight is supported on the head and shoulders with the trunk and legs extended perpendicularly in the air.) From this position knee bending is taken. There should be a slow return to horizontal.

9. Standing at mirror: Stretch tall, lifting under arches, contracting lower abdominal muscles, spreading lower ribs, holding neck well back, with arms relaxed at sides. Relax and repeat.

At the end of the course of exercises, Case B was able to raise her trunk upright from the horizontal, without foot support. This had been impossible at the first lesson.

In these Individual Exercise Classes, the greater proportion of exercises are given in the horizontal position; because it eliminates largely the question of balance, because it is less fatiguing, because it lessens the demands upon the heart, because it minimizes strain upon faulty feet and badly balanced bodies, and because it tends to counteract circulatory conditions which result from a sedentary life.

The reversed or "upside down" positions are also of great value when heart and blood pressure are normal. Since we know that during periods of inactivity the large abdominal veins have an increased blood supply, it seems desirable to let gravity improve this condition, temporarily at least. Then, if we can increase the tone of the abdominal muscles and the diaphragm, we may expect a general improved condition. Some of the reversed positions are: Knee Chest Position (weight on knees and shoulders, hips high). This must be taught so that there is no "sag" in the lumbar region. Prone hanging (Legs supported on bed or plinth, trunk inclined downward, head and arms resting on pillow). Reverse Climbing at stall bars (Grasp lower round of stall bars, arms slightly bent. Swing feet over head to touch stall bars. Climb up and down, one step at a time pressing feet to under side of bars.) Shoulder Stand (A progression from Reverse Climbing. Weight is supported on head and shoulders, trunk and legs exended upward over head. This is an advanced exercise.)

All members of these classes are given instruction in the proper use of the body in standing, walking, sitting, and in activity. The necessity of keeping the abdominal muscles always in good tone is stressed, and the desirability of forming the habit of contracting these muscles while waiting for street cars, while sitting at work, etc., is impressed upon them. Foot exercises are always included in exercise lists, and the correct use of the feet is taught, together with the elements of good shoes. Inactive people have more lung capacity than they utilize. To help them develop this, breathing exercises are given. Through properly taught breathing exercises, the flexibility of the chest walls is increased, the muscles of breathing are strengthened (the diaphragm being most important), and all the lung tissue is used. Each member of the class is taught to contract the "posture" muscles. She learns to lift under her arches, to contract her abdominal and gluteal muscles, to lift her chest, to carry her neck well back, and to stretch tall.

These are the general principles upon which the varied program of an individual exercise class should be based. A great variety of exercises may be given to stimulate the interest of the class members. Exercises with the stunt element are enjoyed by children and the younger members of the class. A victrola is a valuable addition to the gymnasium equipment. Exercises, with a march played on the victrola, make an interesting opening for the class work. Waltz rhythms are excellent for some of the slower exercises. And there are some types which should not be done in time to music, as they require concentration upon the exercise itself and cannot well be done in rhythm.

The work in these individual exercise classes may be considered constructive health-building, and is in line with modern trends in medicine and in education.

March 26, 1931.

53 Burpee Road, Swampscott, Mass.

The Relief of Neuritis by Physiotherapy

By Mary Lee Castleman

Three cases out of four referred to my office for physiotherapy are generally diagnosed as neuritis. Likewise conditions from similar causes in many individuals are listed as arthritis, and present inflamed feverish joints. A similarly painful condition is presented in the neuritis cases (largely occupational), a weak or overused area of the anatomy being the most painful part. The more chronic cases present hives and an itching condition. The controlling of the diet, colonic irrigations, the acquirement of relaxation, a general relief of congestion of the body and a tonic treatment, besides local heat, invariably relieves them and leads us to believe that they come from the same cause, affecting different individuals in a different manner.

Patients suffering from these conditions, when sent for physio-therapy, present an acute condition which needs immediate relief. Local heat, and if possible a general sweat bath are the best means for securing this relief. Local heat, by diathermy infra-red, dry baking or hot packs (any two are best) should be applied not less than forty minutes, promoting both hyperemia and a thorough sweating of the acutely painful area. This should not be immediately cooled with unheated alcohol but wrapped with several heated blankets and the patient put into the most comfortable possible position to rest, and to sleep. This treatment may be continued daily, or twice a day, until relaxation (often impossible at first) and relief from constant pain is experienced.

We are now at a period of intermittent pain, during which time the patient discovers other affected and painful areas. Because the patient becomes irritable we sometimes think he is getting well. This is not usually the case. A first relief only has been obtained, and the patient returning to activity at this points complains that the treatment wore him out, he was so tired he felt worse, therefore the treatment is no good. The doctor often listens to this and as a result the case is a failure for relief by physiotherapy.

The condition is due to an accumulation of acidity caused by an unbalanced metabolism from over-fatigue, too rich a diet, a prolonged period of physical inertia or indoor occupation. The normal outdoor daily exercise has been neglected, and meals have been poorly planned or eaten too fast. We are not dietitians, but much time is gained by showing the patient the advantages of a light diet, short on starches, pork, sweets, etc. If the average patient will drink quantities of orange juice and take white of egg the general acidity is greatly lessened; also a glass of water each hour, enforced rigidly, helps.

Having come to the period of local relief, the cabinet bath and sunlight should be started, and one form of local heat, preferably diathermy as it relieves the deeper tissues, should be continued. For four treatments on alternate days, use one minute of sunlight to eight different body applications, obtaining 32 minutes in all on the last or fourth of this series. A very gentle effluage only of the painful area should be used also, and the rest immediately after treatment continued.

For the last four treatments, a thorough sweat bath, followed by vigorous general massage and sunlight decreasing the distance each time instead of increasing the length of exposure will be found effective. Exercising with slightly graded doses of sinusoidal or faradic current of the muscles of the formerly painful area may be included at this time. This routine will return more than three-quarters of these patients to their work in a vigorous and fit condition.

Washington, D. C.

Why I Included Internal Hydrotherapy

By Emily Johns Griffin

For the past twelve years I have been an active, dyed-in-the-wool physiotherapist starting out under Uncle Sam's tutelage and then in a Private Orthopaedic Clinic, using all the modalities at hand, and there were many and most effective—generally. The exception being the ever present bugbear in the shape of the many typed Arthritis—and its cousins. In our Clinic it was the regular routine to search thoroly all the highways and byways for foci of infection as the most common type of Arthritis has its origin in infection, and in a very large proportion of cases the laboratory report from the intestinal tract came back exceedingly positive. Naturally the only course of procedure was to go after this very pestiferous bug and remove him and all his family before any of the local pains and aches, to say nothing of stiff and enlarged joints, could be expected to improve.

A little review of our physiology will remind us that the digestive tract performs its duty fairly well and vigorously until it reaches the large intestine then the trouble begins. From here on, due to the arrangement of the muscle fibers and bands, there are many chances for processes of digestion to slow up, and then little sacs and pouches formed by the outside muscle fibers, which act as an elastic band puckering up the walls of the large intestine, become filled with undigested material. There it stays and putrifies, chemical changes take place, and it becomes the "Happy Hunting Ground" of many and very annoying little bugs. There are about five feet of this troublesome large intestine nor does it run a straight course. Referring to our anatomy we find a very small door, Ilio-cecal Valve, opening from the small intestine into the large intestine way down in the lower right hand corner of the abdominal cavity. From there the intestine travels up the right side, fighting gravity, where it comes in contact with the spleen and has to make a regular right angle turn, Splenic Flexure. It proceeds all the way across the abdomen, just below the stomach, which sometimes pushes it down out of its regular place causing ptosis, until it makes another right angle turn on the left side, Hepatic Flexure (so called because the liver lives in this neighborhood) where it starts its downward course. Even here it does not follow the straight and narrow path but must needs curve again, this time it looks like the letter "S", Sigmoid Flexure, before reaching the end of its journey in the rectum.

As is very plain to be seen if, for any of many reasons, this tract refuses to function properly there is ample opportunity for the growth of infectious material which in turn is reabsorbed into the system and becomes the cause of much trouble.

Realizing all this we decided that, altho it was not strictly an orthopaedic modality, the surest and sanest way of treating this very active cause of Arthritis was to put into our otherwise most completely equipped physical therapy department, an internal hydrotherapy unit. Then our troubles began for much depended upon the proper equipment and administration of this very important treatment. Therefore a shopping tour was taken and all the fine points studied. Finally a unit was decided upon designed by a physician who had had years of experience in treating conditions present in the large intestine or colon. This unit consists of a simple table approximately 6½ feet long, 2 feet wide and 3 feet high. The upper half is thickly padded and the lower half is made of heavily white enameled blocks which can easily be removed and cleaned. In one of the blocks a toilet bowl is incorporated, in which is a constant flow of water, and which is connected with the regular plumbing of the house, an unusual feature in any table. Against the wall at the lower end, and within easy reach of the operator's right hand, is a set of valves controlling the hot and cold water which supply both the bowl and the three perculators which are so adjusted as to feed the irrigating solution correctly by gravity. On the sliding rack along the front edge of the table is a rest into which fits the three-way valve controlling the flow of water from the perculators, to and from the patient. In the colonic tube, attached to the upper arm of the valve, is a four inch glass tube for the examination of the return material which is allowed to pass thru the valve and, by means of another tube attached to the lower arm, directly into the drain thru a metal pan just under the center of the table. In this pan specimens may be obtained for laboratory examination—a very important matter when looking for foci.

The center perculator holds three gallons and the small ones each one gallon. The large one is filled directly from the overhead faucet and the small ones by syphoning. These perculators, in turn, are controlled by valves so that either one or all may be used. It is customary to use one of the small ones for the preliminary enema. The other small one may be reserved for any medication which the physician wants implanted after the cleansing irrigation. Should more solution be required it is not necessary to leave the patient but merely turn on the water supply with the right hand, the left hand having entire control of the colonic tube. If more bicarbonate of soda is to be added it will be necessary to leave the patient and put this in at the top of the big perculator, a matter of seconds only. The temperature of the water may be controlled either by the hand; or a hydro-thermometer may be kept in the large perculator. The temperature depends upon the desired effect. If to reduce spasticity it must be more than body heat, if to overcome an atonic condition, less than body heat.

This little description is made in an attempt to emphasize the simplicity of the apparatus together with its absolute sanitation and freedom from all possible unpleasant odors, as well as its great efficiency. Patients are very susceptable to all these points and it is not uncommon to hear them say "I stopped going to Miss So-and-so because she had to carry all the water," or "her unit was not kept nicely."

There is a square basin at the foot of the table, which tho not a part of the original unit, is most important, as it is very essential to have a place close at hand into which

the tubes and valves can be placed for sterilizing, preventing running around thru halls and rooms with the tubes. Incidentally the sterilizing of all tubes and valves is a most important problem. I attach one of the tubes to the faucet and force hot water, as near boiling as a Rudd Heater can make it, thru the entire outfit for at least fifteen minutes, before putting it into a disinfecting solution.

There is also a portable unit, consisting of three three-quart bags which, by a series of rubber tubes and glass Y tubes, can be connected with the control valve and colonic tubes of the big unit. In this way when I go to the patient's residence I am able to give nine quarts of solution at a time in the same manner as at the office. The bags can be refilled once or twice as required.

If people's intestinal tracts, especially the colon, were normal they would not be sent to us for colonic therapy, but it is because thru abuse, mainly insidious use of cathartics, disease, or as the result of abdominal operations, they are abnormal and therefore need attention. It has been said that nine-tenths of all human ills may be traced to the presence and absorption of colonic toxemia and the resultant lowered resistance. In the average case from the very beginning, cathartics have been given when there was any sign of sluggishness in the bowel action, and as time went on these cathartics were increased in strength and frequency; in itself proof that they were lowering the vitality of the intestinal walls. Then comes the atonic condition of the abdominal muscles resulting in ptosis of the abdominal viscera, especially the stomach and transverse colon. Adhesions due to infection or post-operative conditions in the colon itself with associated spasticity, mechanically restrict fecal expulsion.

These beginnings being thoroly established there is no end to the resultant conditions. Just to mention a few; auto-intoxication, high blood pressure, neuritis (sciatica in particular), infectious arthritis, epilepsy, anemia, constipation, flatulence and a host of others. In fact keep the intestinal tract in A1 condition and the diseases of middle life would ge greatly reduced. I would like to say here that I personally know of cases of epilepsy that have been completely arrested by the use of high colonic irrigations and I feel that if that one dread condition can be checked that alone is enough to justify the therapy.

Most of our patients are sent to us after middle life which is a great shame for the task would be so much easier if begun earlier, both from the point of duration of the disease and the age of the intestinal and abdominal muscles. For let me say at once that the ideal colonic therapy aims to return the individual's muscle tone and bowel action to as near normal as possible and thus do away with further treatment. Quite the opposite to "Cathartic Therapy."

Mrs. Blank comes from her physician with a diagnosis of chronic constipation, lack of muscle tone, ptosis. She is beginning to have pains and stiffness in her fingers or knees, or some other joint. The prescription reads "High soda-bicarb irrigation preceded by enema." An X-ray series in this or any case would be helpful as a careful study of such is one of the best possible helps, for then all the queer kinks and peculiar angles, strictures, diverticuli, and many other little idiosyncracies may be recognized. One can not be too careful about knowing the condition of the colon as forcing the tube thru a stricture may cause harm. Also one must know of the presence of any sort of growth. Quite frequently, if an X-ray series has not been taken, the first irrigation reveals the presence of something which the wise technician will report to the physician at once and return the patient for further examination.

A gown is given Mrs. Blank and she is told to remove all her clothing. She then lies on the table on her back with her knees drawn up and a light abdominal massage is given for the purpose of relaxing the muscles of the abdomen and softening the packed colon. Some form of radiant heat used in conjunction with this is most helpful as heat always relaxes and is always comforting to the patient. The patient is then turned on her left side and an enema is given. She sits up over the bowl with the hope of emptying the lower bowel. Back on her left side with an electric heating pad over her abdomen, the 56 inch colonic tube well lubricated with vaseline or KY jelly, is inserted a few inches, first introducing a finger to relax the sphincter muscles. By means of the control valve a small amount of water, usually from two to three ounces, is allowed to flow. The valve is turned and the solution and gas flow out. Again the valve is opened and the solution allowed to flow, the tube being advanced very gently and firmly while the solution is flowing but never when reversed. Thus the properly adjusted force of water pushing ahead of the tube makes way for it and the release of this pressure allows that from within to force the water back bringing fecal material with it. This process is continued thruout the entire treatment, great care being taken when passing thru and around the flexures as too great haste may cause the tube to kink or turn back upon itself. One can sometimes feel the tube being pulled thru the sigmoid flexure. Should Mrs. Blank complain of pain the valve is immediately turned as a gas pocket may have been reached or, for some other reason, there is too much pressure. At no time does the colon become distended by too much water as the return flow is carefully watched. It sometimes is necessary to slightly withdraw the tube as the opening may become blocked. From time to time the abdomen is gently massaged, always at the return flow, in the general direction of the colon, that is from right to left, thus minimizing any pressure against peristalsis.

After the hepatic flexure has been passed Mrs. Blank is turned over on her back thus helping the solution to flow thru the transverse colon. Our aim is to reach the caecum as here most of the trouble lies, but this is rarely accomplished in the first few treatments, sometimes never, due to spasticity and adhesions. If it is possible to reach the caecum turning the patient on the right side will help the flow in that direction. Usually the original nervous tension of the patient is overcome and the tube may be advanced quite easily. Here is an excellent opportunity for the practice of psychology. By well directed conversation the patient's mind may be diverted and relaxation much more easily accomplished.

By this time the perculators may need refilling as the return must be clear or nearly so before the irrigation stops. There are exceptions, due to weakness or very severe conditions. Very frequently the first treatment can not be continued until the return flow is clear for the colon has been so thoroly packed that quantities of water would be required and the patient tire. Then again, after illness it is not advisable to stir things up too radically. It is always well to advise the patient that the more severe the reaction the greater is the need of treatment. This fact is perfectly evident when one stops to consider that infection to any degree can not be stirred up and set in motion without a certain amount getting out into the system and causing trouble.

Should there be any medication to follow it is not considered wise to begin implantation until several treatments have been given. The foci of infection being much

stronger than the beneficial germs of the medication, the fight will be too one-sided. Quite frequently Bacillus Acidophilus is ordered and this can be put into one of the small perculators and implanted as well into the caecum as possible and allowed to remain for at least fifteen minutes. The question of medication is a most important one but must rest entirely in the hands of the physician. He knows the type of infection with which he is dealing and that when the whole colon is thoroly free from infection unless proper remedial germs are implanted the old ones will return and the last state of that colon may be worse than the first.

After the irrigation, Mrs. Blank is taken to a rest room where she is told to lie quietly and relax for at least fifteen minutes. Then, if ordered, a few well chosen exercises are given for abdominal tone and strength, these to be done regularly at home. Naturally it depends entirely upon Mrs. Blank's condition whether the very simplest exercises are given or whether the more difficult.

The "Mosher" is a most excellent beginning. Patient lying on her back on a hard couch or floor with knees well drawn up, places hands lightly on abdomen. By means of the abdominal muscles only, not by deep breathing, the abdomen is contracted as completely as possible against the spinal column. Then again by muscle action only, the abdomen is forced upward. A period of complete relaxation follows. The hands have no part to play except that the patient may have the feel of the action of the muscles.

Leg raising with its many modifications may come next. With the patient in the same position as for the Mosher, the knees may be drawn up closer to the abdomen either actively by the patient or by the assistance of the technician. From this position the flexed knees may be moved around with a circular motion from right to left thus massaging the abdomen in the general direction of the colon. The next step in this series may be single leg raising from a completely flat lying position. Not an abdominal exercise but a first step towards the double leg raising which is. Double leg raising must be taken very carefully and slowly. The lowering of the legs, after they have been raised to a right angle position at the hips, is a greater strain on the muscles of the abdomen than the raising. It will be generally found that when the last ten or twelve inches are reached the legs will be dropped most suddenly. Ones ingenuity and imagination can add to the strength of this exercise by changing the position of the hands and by not allowing the feet to touch the floor before they are again raised. Naturally this comes after increased muscle tone.

From the straight lying position draw the knees well up toward the right side of the abdomen, roll them across to the left side, then extend them slowly to their original position. This circular motion, following the course of the colon, helps to massage the colon and aids elimination.

The popular bicycle exercise is very good. Begin with the buttocks flat against the wall, legs extended, hands on hips. Alternate leg lowering along wall is accompanied by arm stretching over head. (Should there be heart complications arms may be extended sideward shoulder height.) This exercise may be increased in severity by moving away from the wall, free bicycle, also by keeping the legs in the half-way position—between the floor and a right angle at the hips.

In cases of ptosis the "knee chest" is most effective. The patient rests on her knees and forehead, with hands under head, hips at right angle and spine on straight line. As this is a passive exercise it is advisable to retain the position as long as possible, increasing as able. All the viscera are inverted and allowed to get back into place. Increase the strength of this exercise by raising first one leg then the other so that there is a straight line from extended toes to the head. It is an excellent plan to take this exercise after getting into bed for the night and then roll over to sleep. Thus the organs are kept in their proper position all night.

There are many more exercises one can use but it seems wise to choose a few effective and simple ones so that the patient does not feel overburdened and disinclined to follow the prescription.

All of the foregoing applies as well, in moderation, to children. Unfortunately it is the habit of parents to rush to their favorite cathartic should their children miss one day without a bowel action. As a general rule nature takes care of this condition in a very much better way. Then, of course, there are the fevers and illnesses of children which always retard proper elimination. One high irrigation will very frequently bring the fever down and what was thot might prove serious has entirely disappeared. For the children we have a smaller tube and it is not necessary, except in specific cases, to try to reach the caecum. Naturally children are more fretful and harder to treat and I find that if "Raggedy Ann" or her brother "Raggedy Andy" accompany me or an interesting story can be told things are much easier.

It has often been asked if high colonic irrigations do not weaken the intestinal tract and retard peristalsis thus defeating their own purpose. The answer is decidedly NO. The very fact that there is a slight irritation caused by the contact of the tube against the walls of the colon peristaltic action of the muscles is started, increasing their tone, and it is by means of peristalsis that the content of the colon is moved onward. At first these irrigations are ideally given daily for four or five days, then decreased to three, two and one a week, finally one every two weeks. It is wise for the patient to return once a month for a short time so that there can be no chance for a stray bug being left behind and to be sure that the exercises are not being neglected. As second best a good deal can be accomplished by two irrigations a week carried on for a considerable period.

It would seem then, that colonic therapy has a very real place in the practice of medicine and is not just a fad which will have a very short life. The health of our entire body depends upon proper elimination thereby removing waste and toxic products. The modern habit of life with its eternal rush, allowing no time for proper habit forming, and necessitating the swallowing of our foods practically unmasticated, will be an eternal cause for the necessity and continuance of this very important and scientific therapy.

Montclair, N. J.

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EDITORIALS

The Mental Attitude of the Physiotherapist

The person who deals with human nature as his life work must bear in mind that each and every human being is an individual and that every individual has his or her individual characteristics. This is especially true when dealing with persons suffering to a lesser or greater degree from some physical handicap; to the extent that the physiotherapist realizes this factor, the success or the failure of her work depends.

At times physiotherapy has to be introduced quite subtly and used more as a wedge until the distraught nerves of the patient can be relieved of their tension. The successful physiotherapist must understand her patient's mental attitude toward life in general, toward the doctor in charge of the case, as well as the reaction towards the operator's own personality and mode of treatment. There is no surer way to understand others than to try and put ourselves in their place, we will find it hard to get beyond the golden rule left behind by the greatest of all healers; he said, "All things whatsoever ye would that men should do to you, do ye even so to them." Understanding interest is not the kind that offers maudlin sympathy, which is worse than none at all.

The patient listener has an important place in this world and more especially so in the work of rehabilitation. This person many times is capable of helping to readjust and clear the mental outlook so that the way is opened for physical upbuilding. Nothing breaks down courage, even among the hardiest, so completely as a long period of sickness, the physiotherapist should be ready to engender courage when such is needed. Last but not least, there is that great word hope, without hope it is indeed hard to "carry on." With hope the whole character of trouble changes, it is the part of the physiotherapist's duties to recognize this and bear in mind that no patient should be left in an entirely negative state of mind. How many times has it been proven that after medical science has pronounced the case hopeless that a temporary and sometimes permanent betterment has come about. Therefore, do not withhold hope. With all the hope that can be held out at times, it is hard enough for some to face the days ahead.

The Constitution and By-Laws of the American Physiotherapy Association demand technical training and experience and in addition the qualities above mentioned are necessary if the work of the physiotherapist is to bear fruit. With these qualities plus a sound technical training the life of the physiotherapist is rich indeed beyond the mere monetary side, and the possibilities of doing things worth while are almost unlimited. What more can one desire of a life work?

M. McM.

Perhaps many of you will be in New York City this summer. Some of you may wish to spend some of your days seeing what New York does in Physical Therapy. There are, of course, innumerable clinics, but I will note a few that may be of special interest to you.

The new Columbia University Medical Centre has several separate clinics, all worthy of a visit. The largest department is in the Vanderbilt Clinic. Its electro and hydro-therapy departments are particularly well equipped. Neurological Institute, likewise a part of Medical Centre, is doing notable work. At the State Psychiatry Clinic they are using the new short wave lengths in the treatment of general paresis, etc. This is a new and most interesting field. These three clinics are all grouped in one unit, which may be a definite advantage if you wish to see much in a short time.

At New York Orthopedic Hospital the field is limited to therapeutic exercise and massage, but the work done is splendid. The Hospital for Ruptured and Crippled boasts of the only indoor pool for such work in New York City. It has as well a complete department otherwise. Both Beth Israel and Beekman Street Hospitals have well equipped and busy departments.

This will serve as a guide, though there are many other clinics worthy of a visit.

The New York Chapter hopes you will see work of interest and wishes you a gay time in "little old New York."

M. A. H.

Boston, San Francisco, Chicago, Atlantic City, Cleveland, Washington, Minneapolis, Portland, Detroit and soon Philadelphia. There we have gathered from the North, East, South and West for ten years to make a

common interest of our problems, successes and failures in physical therapy. Though many questions have been solved and we have shared some bright success and learned from failure, as all wise children do, we are still to be confronted with more problems and responsibilities. We are still growing and must continue to do so. Each present member and each entering one is a tremendous force for growth or disintegration. "Am I my brother's keeper?" Yes—in so far as each of us works for our profession. We make or mar it in the eyes of the patient or the doctor. There is not a case, however light, that cannot show whether we have done our best or not. Like the ripples in a pool, individual effort radiates outward. Physical therapy is being carefully watched and even more so are its workers. The careless technician, the over-zealous enthusiast and the physiotherapist-who-knows-more-than-the-doctor hold the good name of the profession in a very dangerous position. Will the right to sign initials after our names make us better workers? Will state legislation make us any more conscientious? No! There must be a continual searching for new knowledge and polishing of old; a discarding of outworn theories and habits; an unending weeding out of an inflated ego; a renewal of determination to give wholehearted effort to our chapter, association and profession. Thus only can we make of our services a mellow and radiant thing.

Approved Schools of Physical Therapy

Beth Israel Hospital
Newark, New Jersey
Dr. Jerome Samuels
January, 1931 (Official notice)

Bouré-Boston School of Physical Education
105 South Huntington Avenue
Boston, Massachusetts
Miss Marjorie Bouré
January 3, 1930

Children's Hospital
Sunset Boulevard
Los Angeles, California
May 1, 1927

New Haven School
303 Whitney Avenue
New Haven, Conn.
Dr. H. E. Stewart
May 1, 1927

Philadelphia Orthopedic Hospital
17th and Sumner Streets
Philadelphia, Pennsylvania
May 1, 1927

Tacoma General Hospital
Tacoma, Washington
Miss Ruth Babb
Before June, 1929

University of Michigan Hospital
Ann Arbor, Michigan
Miss Mabel Holton
November 21, 1930

University of Wisconsin
Madison, Wisconsin
Dr. H. D. Denniston
November 21, 1929

Walter Reed General Hospital
Washington, D. C.
May 1, 1927

Course in Physical Therapy, No. 445

Battle Creek Sanitarium
Battle Creek, Michigan
Mrs. Mary Steines Foy, R. N.
Post Graduate
March 9, 1928
Discontinued this year, official letter Mrs. Foy.

Harvard Medical School
240 Longwood Avenue
Boston, Massachusetts
May 1, 1927

Northwestern Medical School
303 East Chicago Avenue
Chicago, Illinois
John S. Coulter, M. D.
Before June, 1929

Approved Courses in Physical Therapy

Course for Graduates No. 441
Harvard Medical School
Boston, Massachusetts
March 15, 1931

University of Iowa
Iowa City, Iowa
Dr. Arthur Steindler
March 15, 1931

Abstracts

By John S. Coulter, M.D., Assistant Professor of Physical Therapy, Northwestern School of Medicine

Derangements of the Semilunar Cartilages. W. Russell MacAusland, M.D., Boston, Mass., in Ann. Surg., xciii:3:649, March, 1931.

Based on a study of 388 operative cases.

The author considers anatomical considerations, etiology, the mechanism derangement, surgical pathology, pathological and histological considerations, diagnosis, differential diagnosis, conservative treatment, operative treatment, technic—preoperative care, excision of the cartilage and after-treatment.

Regarding after-treatment the author says that to avoid the formation of adhesions we are applying a snugly fitted voluminous flannel bandage from the toes to the hip with considerable reinforcement about the knee joint. This bandage holds the knee snugly, and by producing compression prevents any extravasation of fluid and hemorrhage subsequent to the operation. In addition, the bandage, as it begins to loosen, allows a little freedom of motion during the first week after the operation. Our experience with this procedure thus far seems to bear out our view that it is preferable to complete post-operative immobilization.

The duration of the convalescence depends entirely upon the pathology. Recovery from a hypermobile or torn cartilage that has been treated promptly takes place within a few weeks. Arthritic cases, on the other hand, recover more slowly. In the simple case the compression bandage is worn for ten days to two weeks. As soon as the temperature is normal and the patient is comfortable, he may begin to walk with crutches. At the end of two weeks, hot fomentations and gentle active movements are carried out daily, and speed up the convalescence. In three weeks the patient should be able to bend his knee to a right angle. Massage of the thigh and calf should be instituted as early as possible. In eight weeks most patients are able to resume moderate activity. Other patients recover much sooner. I have known a juggler to return to the circus at the end of three weeks. Convalescence is likely to be slow in industrial cases, as these patients may be influenced by the fact that they are drawing compensation as long as they are disabled, and they are, therefore, loath to use their muscles from fear of pain.

Correction of a talipes valgus or a weak foot should be practiced as a routine procedure, following the removal of the cartilage, in order to prevent strain on the internal lateral ligament. A lift on the inner side of the heel and sole may be used for this purpose.

Dislocation of the Shoulder. By Clay Ray Murray, M.D., Assistant Professor of Surgery, Columbia University College of Physicians and Surgeons; Associate Attending Surgeon, Presbyterian Hospital in the City of New York, N. Y., in J. A. M. A., 96:5:337, January 31, 1931. (Read before the Section on Surgery, General and Abdominal, at the Eighty-First Annual Session of the American Medical Association, Detroit, June 27, 1930.)

In my own experience, I have found that, when carefully tested out, between 55 and 60 per cent of shoulder dislocations show some involvement of the circumflex (or axillary) nerves, with consequent weakness of the deltoid. It is obviously impossible to test this out by deltoid function, since pain and swelling inhibit motion. But if skin sensation over the deltoid region and the electrical reaction of the muscle are carefully tested, the lesion can be demonstrated. Violent manipulation, in addition to causing or intensifying nerve lesions, increases infiltration of the muscle bellies and the capsule of the joint, and increases edema of these parts by further thrombosis of vessels. If the arm is then immobilized and physical therapy is delayed for some days while the arm is tied up, organization and fixation of this infiltration occurs to a considerable degree, nerve convalescence is considerably handicapped, and functional return delayed or even impaired. It is logically essential, then, that early physical therapy and early active mobilization be instituted, it being borne in mind that there is impairment of deltoid function in a large percentage of cases, as a result of combined nerve and muscle lesion, and that failure of the patient to carry out successfully the prescribed exercises may be due as much to physical inability as to that too familiar alibi and explanation, his uncooperative nature.

For these reasons, I prefer to treat all dislocated shoulders, even those showing no evidence of nerve involvement, by a few days in bed in suspension and light traction, with the application of constant heat through the use of a tent containing two electric light bulbs, the application of light massage two or three times a day, the use of the therapeutic lamp for fifteen minutes two or three times a day in addition to the constant heat, and the application of frequently repeated short periods of active voluntary motion by the patient within pain limits, abduction and forward movements being used at the shoulder up to 60 degrees, with full range of elbow motion and full range of wrist and finger motion. In those cases showing nerve impairment, electrical stimulation of the muscle should be used as well and the period of bed treatment is extended from a few days to ten days or two weeks, or, in severe cases, even to three weeks. The substitution of mere motion for combined motion plus weight lifting is important. With a sore wrist which can, however, fully pronate and supinate, one is unable to turn a door knob because of pain and muscle spasm. With a sore elbow which can flex and extend perfectly, it may be impossible to lift even a moderate weight because of pain and muscle spasm. With these shoulders in which painless and free motion is possible in traction-suspension (which removes the weight lifting element), frequently no motion is possible with the patient up and around because of muscle spasm, since in the erect posture he has to lift the weight of the arm and forearm with every abduction and forward movement at the shoulder, inducing pain and muscle spasm.

When the patient comes down out of traction-suspension, this difference is quite noticeable and an immediate lessening of the range is noted. The after-treatment utilizes a sling for ten days, gradually discarded, keeps up the physical therapy (although this has done its major work in the first few days) and adds to it occupational therapy or forms of exercise having some useful purpose and employing abduction and forward movements of the arm as well as rotation. These are far better, if they can be used, than set exercises in abduction and rotation, because the patient's mind is on something else besides the motion he is making and this mental attitude diminishes muscle spasm and apprehension with a minimizing of pain and results in more natural and extensive movements than any set exercises can give, and therefore in more rapid convalescence. Abduction and forward movements are allowed up to 90 degrees in the second week and start beyond 90 in the third week. Up to the end of the third week the patient wears a swathe binding the arm to the side at night to prevent a redislocation through excessive movement while asleep. I consider the time spent in bed by these patients as a saving of weeks at the other end and therefore distinctly worth while.

There remain a number of patients whom it is impossible to subject to bed treatment for economic reasons, general physical reasons or temperamental reasons. These patients, after the reduction, have a sling, are subjected to as much physical therapy as possible, and are given as much active motion within pain limits as is possible. The latter is difficult because of the weight lifting factor involved. Occupational therapy and useful movement have some value after the first few days. Having the patient bend forward at the hips and swing the dependent arm from the shoulder backward and forward and from side to side is a useful method of getting some motion with a minimum of pain and spasm. A weight grasped in the swinging hand, increased day by day, adds to its efficiency. For true abduction and forward movement I have recently tried out a suggestion made to me by Dr. David C. Bull of our staff, which consists in having the patient practice these movements while sitting in a bathtub full of water. The buoyant effect of the water takes care of the weight lifting element much in the same way as traction and suspension, and thereby eliminates largely pain and muscle spasm, giving remarkably free and painless motion range. It is distinctly a worth while procedure, particularly in apprehensive individuals and in those with nerve lesions.

Fractures of the Upper End of the Humerus. By Donald Gordon, M.D., Associate Surgeon, Fifth Avenue Hospital, New York. (Read before the Section on Surgery, General and Abdominal, at the Eighty-First Annual Session of the American Medical Association, Detroit, June 27, 1930.) In J. A. M. A., 96:5:331, January 31, 1931.

The initial step in preventing injury to the soft parts is to put the shoulder at rest by immobilizing the limb when first seen. A large thick axillary pad of nonabsorbent cotton batting or its equivalent is used to fill the space between the body, arm and elbow. The forearm is flexed across the body; a sling of muslin bandage used for the purpose supports the wrist, and another lighter pad is applied to the outer surface of the arm which protects the skin and prevents pressure on the lymphatics.

There are those who believe that in most fractures of this region function will be recovered more quickly if they are treated in the abducted position. This dictum should be briefly analyzed. If it is necessary to use this position to maintain reduction, the abductors and elevators atrophy short, and the adductors atrophy long.

Reduction should be made before the hemorrhage fills the spaces made by the displaced fragments and before the edema has so distended the muscle compartments that the elasticity of the muscles has been lost. Every second that the reduction is delayed following a fracture, these factors are working against success.

Manipulation maneuvers will be fruitless unless performed with complete anesthesia, whether this is brachial block or general inhalation.

Traction is applied by means of a wide muslin bandage, the middle of which is attached to the limb by throwing a Collins' or similar hitch about the wrist, which has been protected with a folded towel. Countertraction is made with a folded sheet about the thorax.

Intrinsic traction is the term employed when the weight pulley is attached to the supporting splint. Suspension weights have to be equal to the weight of the arm and traction weights.

Extrinsic traction is the term employed when the weight pulley is attached to some support not on the suspension splint. The suspension weight need only be equal to the weight of the limb, but the axis of the arm and pull must be the same. These two methods can sometimes be combined.

How long should a dressing be left on? Any retention dressing or traction should be left on until there is no tendency to displacement on gentle manipulation of the fragments. Following this period such dressings should be kept on as will prevent the extremes of any movement allowed by the degrees of progress. Atrophied muscles are unable to arrest the extremes of any movement allowed this swinging lever without the production of pain.

In the first few days, the judicious use of an ice bag or heat to the shoulder affords comfort. The early cooperation of a physician trained in physical therapy to advise and direct the use of the indicated modalities can be aided by the suitable arrangement of dressings to permit these procedures. Great care should be taken to avoid any massage that is followed by a painful reaction. If this is preceded by hot stupes, I think that there is more relaxation and relief than with radiant heat.

The exercises to be used when due are as follows: The patient stands leaning forward, his weight supported by the uninjured arm resting on a table's edge. The affected arm is allowed to hang down in a vertical position with the shoulder muscles relaxed. He sways the body, thus swaying the relaxed limb forward and backward, then laterally, then in circles with and against the clock. This is done in arcs of a few degrees and inside the threshold of pain; quality and not quantity is sought. This gently stretches the muscles of the scapulohumeral joint. It is pure pendulum motion, and this is amplified until the arm reaches the equivalent of the horizontal plane of the erect position. Then movements are gradually changed to slow movements, which must be voluntary, duplicating the former swinging movements. This gives active coordinated muscle movements while the weight of the limb affords traction and the disadvantage of the horizontal lever action spoken of previously is avoided. Should the patient be bedridden at this stage, the limb can be supported by a long sling supported by a high overhead suspension (Fig. 10) and abduction movement carried out as is done with the leg following a fracture of the hip. This relieves the shoulder muscles from supporting the weight of the horizontal limb while the muscles are weak. All these movements must be in the scapulohumeral joint and the scapula should be watched to see that it moves as

little as possible, even if it has to be fixed by the instructor's hand holding the anterior border. Later resisted abduction movements of the arm with the resistance proportional to the weakened musculature will make the patient fix the scapula before abduction at the scapulohumeral joint can take place (Fig. 11). This is an excellent test for the malingerer at this stage of repair. Climbing the wall as usually performed does more to interfere with scapulohumeral movement than anything I know of. The patient fixes this joint and proceeds to carry out the movement by scapular action hunching the shoulder, thereby developing the adductors more than the elevators. The limb should be abducted or extended by the fingers pulling on the rungs of a small ladder suspended on the wall, with the shoulder joint relaxed. The limb should not be dropped suddenly from the altitude reached, but gradually lowered by the fingers.

If contracture develops in the adductor group of muscles, the arm is stretched about twice a week (Fig. 12). The patient should lie on a table, the operator's left forearm hooked under the hooked right arm of the patient, or vice versa, according to the injured arm, the patient relaxing; this allows the weight of his forearm to be supported on the operator's forearm with the latter's same hand exerting traction on the arm of the patient. The operator's other hand is used to fix the anterior border of the scapula. The patient's arm is then extended forward and upward on the scapula at an almost imperceptible rate until the adductors are put on a tension and gently stretched just beyond the pain threshold. The arm is then returned to the side in slight abduction and traction applied with the hand for a few seconds until pain is relieved. This should not be done until the bone is well united late in convalescence, when delayed function is due to muscle contracture, and should never be done under an anesthetic.

In directing exercises, the physican should make sure that the patient does not hunch the shoulders, which is due to scapula action, but should insist on pure scapulohumeral action within pain limits. The patient should look in a mirror to see the difference between the two movements. Adhesions in the shoulder joint must not be blamed for loss of function due to muscle contracture which has developed and can be treated.

Intertrochanteric Fracture of the Femur. By S. Potter Bartley, M.D., Brooklyn, in J. A. M. A. 96:7:488, February 14, 1931. (Read before the Section on Orthopedic Surgery, at the Eighty-First Annual Session of the American Medical Association, Detroit, June 26, 1930.)

The treatment of the patient suffering with an intertrochanteric fracture may well be divided into two parts:

1. A careful survey of the general condition of the individual.

2. Treatment of the local condition. In my opinion the form of treatment which most nearly meets the foregoing indications is that of traction with suspension and abduction of the limb. This treatment is applied as a routine in all intertrochanteric fractures excepting the incomplete fractures without separation of fragments. In such instances the patients are simply kept in bed, perhaps with the limb supported with sandbags, for a period of three weeks. During this period heat in the form of infra-red rays and massage are applied daily. This procedure seems to diminish the pain at the site of the injury and to increase the resolution of swelling.

The patient is then ready to be discharged from the hospital and as an ambulatory patient is given physical therapy three or four times a week. This physical therapy consists of infra-red irradiation or diathermy applied to the intertrochanteric region and hip joint, together with massage and active exercise of the knee and hip. Abduction and rotation are particularly important in this type of fracture.

The ambulatory splint is worn until the union has progressed to the point at which weight bearing without support seems safe, in uncomplicated cases about the end of the fifth month.

The Closed Method of Treatment of Fractures of the Ankle Joint. By Carlo Lorenzetti, M.D., Assistant at the Surgical Clinic, University of Milan, Milan, Italy, in Archives of Surgery, 22:1:121, January, 1931.

The temporary lever apparatus used by Professor Baldo Rossi in the Surgical Clinic of Milan for the reduction of the lateral and posterior displacements of the foot is the Dupuytren apparatus, to which has been added some important modifications which make it more efficient. After the temporary reduction by this apparatus, plaster is used for immobilization.

A description of this apparatus and the way that it is used follows:

1. The lower extremity is covered with a layer of absorbent cotton. A wooden splint (from 90 to 100 cm. long, 6 cm. wide and 1 cm. thick) also covered with absorbent cotton is placed on the inner side of the extremity. It extends from the distal two thirds of the thigh distalward to 10 cm. beyond the plantar surface of the foot.

2. A large pad of cotton is now placed between the inner surface of the lower two thirds of the leg and the splint.

3. The upper part of the splint is fixed by means of bandages which below include the cotton pad. There must be considerable space between the foot and the splint. This is secured by the cotton pad.

4. After manual correction of the gross displacement, the foot is forced, by means of bandages, tighter and tighter against and over the inferior third of the splint, so that the foot is in a marked varus position. In this way, the lateral displacement is corrected.

It is not always easy to secure the varus position at once. The reduction is secured by degrees by tightening of the bandages and corrective maneuvers about the heel. It would not be wise—frequently it is impossible—to secure by a single violent manipulation a complete reduction of the fragments in some of these cases.

The methods advocated in this paper permits of gradual and progressive reduction. The muscle spasm is overcome gradually, and the traumatized tissues gradually accommodate themselves.

The bandage should be applied so that the roll when tightened causes a gradual reduction of the fracture with the foot in an overcorrected position.

5. If in addition to the eversion, there is also a posterior dislocation of the foot, this must be corrected before the foot is brought into the varus position by bandaging it to the internal splint. Cases in which the dislocation is combined with a large posterior marginal fragment of the lower end of the tibia must be differentiated from those in which the posterior dislocation is the result of a marked diastasis of the tibia and fibula.

6. When reduction is completed, a roentgenogram must be taken at once in two planes in order to determine whether or not the results are satisfactory. If the correction is not satisfactory, the astragalus, although in supination, not bearing the proper relations to the articular surface of the tibia, or the lower fibular fragment not being placed in its proper relation to the tibia, attempts can be made deliberately to improve the results, preferably on the following day.

7. The temporary internal splint is left in position from eight to twenty days, depending on whether there is swelling of the soft tissues, the amount and complexity of the displacement and the time required in the different stages of reduction.

When it is thought that a satisfactory reduction has been secured, this original dressing is removed and a circular plaster cast applied in order to maintain the reduction effectively. The plaster cast is applied over a stockinet fashioned to fit the leg and foot, so that the plaster will be accurately adapted to the parts. A strip of cotton may be used over each malleolus to prevent pressure and over the upper and lower ends of the cast so that cutting of the skin will be prevented. If the cast is so applied, the displacements will not recur.

The plaster cast extends as high as the tuberosities of the tibia as a rule, motion at the knee being permitted.

The cast is left on for thirty, sixty or seventy days, depending on the type of fracture. The cast must not be removed too early, and the formation of callus in malleolar fractures is frequently delayed. In order to secure good bony union, immobilization the stiffness of the joint which may develop is of no marked significance, for it usually disappears in one or two weeks when physiotherapy or rational treatment is instituted.

When the cast is removed, an examination is made to determine whether or not there is good union. If movements of the foot and weight-bearing cause pain, and if the roentgenogram reveals fibrous callus insufficiently consolidated, a lighter cast is applied after gentle massage and passive motion of the foot has been instituted. This second cast may be worn twenty, thirty or forty days, depending on the case.

When the cast is finally removed, the after-treatment is begun; massage, hot baths, diathermy and artificial sun baths are employed to promote the circulation, reduce the edema and hasten the formation of bony callus and union.

Ionic Medication in Dermatology. Principles, Experimental Confirmation and Clinical Application. Loren W. Shaffer, M.D., Detroit, in Arch. Derm. & Syph., 23:2:287, February, 1931.

COMMENT

So many factors are to be considered under the head of treatment by ionization that its explanation becomes complicated. The laws for simple electrolysis, as has been seen, are not applicable to ionic medication in man, and the more one attempts simple explanations the more involved the problem becomes. Much cannot yet be explained.

In the experimental work outlined, two conductor observations were made. On the one hand, anesthesia was introduced in the skin with rather small milliamperage in as short a time as five minutes, which undoubtedly means that penetration is rapid; on the other hand, it was demonstrated physically that penetration is slow. One easily becomes enthusiastic when the results with cocaine alone are considered as proof of penetration; as easily pessimistic if the results with zinc, silver or lead are considered. In other words, certain drugs (cocaine, epinephrine, iodine, ferrous sulphate, etc.) penetrate rather readily, and others (zinc, lead, ferric sulphate, silver, etc.) are precipitated on the surface and their effects are purely local. One needs to know more about the penetration of the ions of more drugs. Why, for instance, do the ions of ferrus salts penetrate moderately well, while those of the ferric salts penetrate poorly if at all? As shown by variations in the efficiency of cocaine for anesthesia, one needs to know more about suitable solvents for each drug, as well as the activity of each in ionic form.

Cocaine has properties which permit its absorption unaided through mucous membranes. It is probably this faculty that permits its ready absorption through the skin when given some aid by an electric current. Epinephrine, which has been reported as being readily absorbed in ionic form, has similar properties. Certain authors have stressed the fact that ionic anesthesia is much more persistent than that introduced by hypodermic injection as proof that ionic medication penetrates cell membranes and is therefore the most effective form of medication. I feel that the persistence of anesthesia may be due directly to the current, which produces prolonged edema in the part, resulting in delayed absorption.

I suspect that drugs under the influence of the galvanic current penetrate more readily through the inflamed than through the normal skin; that in coccigenic sycosis, for instance, the main portal of entry for the surrent is through the active pustules, thus rendering these points subject to intensive current, as well as medication, and that the good results reported in a few cases of lupus vulgaris are due to the caustic effect of zinc sulphate with a natural selection of the apple jelly nodules as the points of maximum intensity.

The question of the effects of the drug, in contradistinction to those of the current itself, is difficult. I am treating patients with the current alone (using sodium chloride as an electrolyte) to test this point. I believe that the effects of the current may at least be fortified with proper selection of drugs, although I doubt that they should be given undisputed credit for results that may be secured.

Finzi showed that tissue stained after being subjected to the chemical action of the negative pole (H ions) had an increased affinity for basic stains; that tissue stained after being subjected to the chemical action of the positive pole, O H ions, failed to take basic stains. The effect persisted for as long as two days, even in the living animal. Confirmation of this point was noticed in the staining of sections of skin as previously described. In other words, there is the question of hydrogen ion concentration, so enticing, to modern physiologists. One can evidently alter the hydrogen ion concentration of the living tissues in a rather persistent manner by the galvanic current, and this phase of the study would bear further investigation.

Another interesting speculation is the effect of the galvanic current on the osmosis of the living cell (cataphoresis).

According to Turrell, the therapeutic effect of the galvanic current is due simply to the heat generated in the tissues and the increased functional activity from the bombardment of the tissue cells. I have been unable to demonstrate that sufficient heat is produced, by currents of such low potential, as to be a factor in therapeutic results. By applying the pads used in treatment and leaving them in place long enough for their temperature to approach that of the normal skin and then proceeding with the treatment, I have observed no appreciable rise in the temperature of the skin (as registered by a clinical thermometer under the pad) at either pole, as compared with a control pad not subject to the current. Temperatures in no case higher than 97.4 F. were recorded, although it is admitted that the method was rather crude and that evaporation from the pads would tend to reduce the actual temperature of the skin when so taken.

In my opinion, treatment by ionization is worthy of

further investigation and clinical trial, if the limitations enumerated throughout this paper are borne in mind. I am anxious to try it in resistant cases of blastomycosis and actinomycosis, as well as the cases enumerated, at the same time endeavoring to analyze further the effect of drug and current. The results reported in alopecia areata are probably largely due to the current and its counterirritant effects rather than to the drug employed. They would seemingly be more readily obtained by other more easily applied methods. I find no reference to its use in thrush of the leukoplakial type of the mucous membranes, nor in dermatitis repens, in which it may be of value.

Until one can answer specifically more of the questions enumerated, the use of ionization will be largely on an empiric basis and therefore unsatisfactory. Yet, much of present physical therapy is empiric, including the use of x-rays. It behooves one to be conservative in charging clinical results with ionization and especially the method of action.

SUMMARY AND CONCLUSIONS

The general principles of ionization in therapy are reviewed, as well as the experimental work on this subject. It is generally accepted that, in life, drugs cannot be driven deeper than the subcutaneous tissue. Experiments performed with the use of physical solutions showed that: The rate of penetration of ions varies directly with the voltage; various ions travel at different speeds.

The rate of penetration in physical solutions and tissue is surprisingly low.

An endeavor has been made to show the path followed by drugs under the influence of the galvanic current in their penetration of the epidermis. The assumption that the sweat ducts are important portals of entry has been strengthened but not proved. A portion of the current may penetrate directly through the epidermis to the nearest papillae. The literature has been reviewed for clinical reports on the use of ionization in dermatology. It has been used in practically all types of chronic infections of the skin.

Five cases of coccigenic sycosis have been reported, in four of which a rather prompt and satisfactory response has been obtained by treatment with ionization or compound solution of iodin. The cases have not been observed long enough to ensure against relapse. In the fifth, a recent case, treatment is still being given.

In two cases of dermatitis papillaris capillitii, the response could not be classed as satisfactory.

In more than half of six cases of pruritus ani and two of pruritus vulvae, very excellent to good results were secured.

Two cases of verruca failed to respond. Two cases of lupus erythmatosus failed to respond to treatment by ionization of quinine, although one is seemingly responding well to that by ionization of gold and sodium thiosulphate.

Satisfactory anesthesia for dermatologic surgical procedures may be secured by the use of ionization with cocaine, but persistent erythema and pigmentation render the method of little practical value.

The Problem of the Functional Nervous Case. W. H. Hengstler, M.D., Instructor in Nervous and Mental Diseases, University of Minnesota, Saint Paul, in Minn. Med., xiv:4:308, April, 1931.

There is perhaps nothing in the field of medicine, today, more deserving of consideration than the so-called functional nervous case. Drugs, operations and arguments fail in giving relief, and the patient travels around from one to another of us and then descends to the chiropractor's level and to that of various other cults.

Heredity plays its part in helping to establish the pattern of personality in the individual. The next great factor is that of experience. No two persons would react exactly alike to the same experiences, but with heredity as a background, experience becomes a vital factor in disorder of personality, and out of experience rise all the myriad reactions and effective symptoms which so ensnare the patient and make his life unbearable. Greatest of these is fear.

Many other elements enter into the pattern of these cases and to enumerate them or to classify them here is out of the question. The early life of the child, the home environment and the "parent-child relationships are worthy of mention. Lack of proper discipline, absence of love and compatibility in the home, excessive coddling and petting by fond parents during childhood, or excessive anxiety for the child's welfare on the part of the parents, are all very important. Sex education and sex information, imparted at about the age of puberty, will save many a child from defensive reactions which may cause untold misery later on.

Turning our attention to the treatment of the functional nervous case, we enter a great field of endeavor which presents innumerable problems of detail, but which, nevertheless, is sponsored by definite and well-balanced principles. From the standpoint of treatment, these cases fall into two large groups:

1. Those not disabled as far as vocation is concerned;
2. Those so affected that they are no longer useful members of society, and are unable to follow their normal occupation.

General principles of treatment are the same in both groups but the details differ. It is with the severely affected type that we are chiefly concerned—those who are so out of adjustment, psychologically, that they can no longer earn a living or balance themselves emotionally so as to fill their normal place in life. To treat such a case successfully in the home or as an office patient is impossible. Surrounded by friends or relatives, the patient is unable to free himself from the emotional morass into which he has sunk, and anything the physican can do either in the office or by calling at the home is promptly neutralized by the home reactions. Sending away on a trip rarely does good.

The first step needed to insure success is to get the patient away from home and into a hospital or sanitarium. Here a neutral atmosphere can be established and the physician can secure perfect control of his patient and have his orders properly executed. The next step is to exclude family and friends and shut off telephone calls and mail.

From then on it is up to the doctor to sell himself to the patient and conduct a campaign of education which will result in recovery. This requires time: daily bedside visits, where often it becomes the doctor's job to sit and listen. Recovery is never rapid.

Convalescence is punctuated by frequent periods of depression, with return of old fears or the appearance of new ones. Ridicule and sarcasm have no place in the treatment of functional nervous cases, and if used will do positive harm and retard recovery.

Physiotherapy, baths, massage and electrotherapy, with many forms of suggestive treatment, are all useful adjuncts. Attention to diet and personal hygiene, with proper regulation of body weight, are also in order. Drugs are given as little as possible, but are used where indicated, particularly to secure adequate sleep at night. Proper adjustment of rest and exercise, with various diversions such as games and occupational therapy, are

always proper, particularly during the convalescent period. The hospital or sanitarium regime must be continued until recovery is complete enough to insure self-confidence, and absence of all the former troublesome symptoms.

Irradiation of School Children. Abstract in Jour. A. M. A., 96:13:1103, March 28, 1931, from Lancet (London) 1:182, Jan. 24, 1931.

Hill and Laurie present the results of a controlled investigation of the effects of irradiation of school children. Four areas of the town of Derby were selected—roughly, North, South, East and West—and a random sample of 100 children were taken from each area. Four groups were formed, each group consisting of twenty-five children from each area, so that all groups were comparable as regards living conditions. The ages were between nine and twelve years, and, as the groups were formed by random sampling, any effect of age was minimized. The test extended over sixteen weeks. The children in group 1 were given radiation 6 feet away from a long flame tungsten-cored carbon arc twice weekly. The lamp ran on 85 volts and 15 amperes and the maximum dose was ten minutes back and ten minutes front six feet away and this given twice a week. The children in group two were given one viosterol pellet at school daily. Each pellet has a dosage of vitamin D equivalent to that in about two ounces of cod liver oil. The children in group three were given exactly similar looking pellets but containing no viosterol daily, and attended, also for exposure to an arc fitted with a glass screen twice a week. This group was put in to demonstrate the part, if any, that psychology plays in the taking of pellets and the mere fact of undressing before a lamp. The children in group four were controls, who had nothing done for them at all. It was noted that:

1. Marked improvements under any particular heading, or class of headings, were always shown in groups 1 and 2, and not by a small margin that could be due to fortuitous circumstances, but by a really appreciable margin.
2. In no case did groups 3 and 4 show better results than groups 1 and 2.
3. Group 1 always showed slightly better results than group 2.
4. In no case, in groups 1 and 2, was there any retrogression in the health of the children, except in the single instance of enlarged cervical lymph nodes, for which there was an underlying cause, untreated except by irradiation.
5. The cases that showed really spectacular improvements were in group 1.

The Response of Blood Platelets to External Stimuli: Ultraviolet Light, Iodine and Coal Tar. Paul E. Steiner, M.S., and Francis D. Gunn, M.D., Chicago, in Arch Pathol., 11:2:241, February, 1931. (From the Department of Pathology, Northwestern University Medical School).

EFFECT OF ULTRAVIOLET LIGHT ON BLOOD COUNTS

Comment.—These results agree with those of previous investigators as to the general effects of ultraviolet light irradiation on the numbers of the blood elements, with special reference to that of the platelets. There is a rise in the blood platelets following exposure to moderate doses which begins in from two to three days, reaches a maximum within a few days, and then falls rapidly. There are rabbits, however, that do not respond to this type of stimulation. Also, there are rabbits in which the daily fluctuation is normally very great. This makes it necessary to interpret all changes following experimental procedure with great caution. Furthermore, it seems that in susceptible rabbits changes can be produced with slight irritation, such as small lacerations of the skin. This must be carefully ruled out by making new normal counts after shaving or by clipping the hair instead of shaving.

EFFECT OF IODINE

Comment.—Thrombocytosis developed in four of the six rabbits following application of iodine to the skin of the back. In two cases marked anemia developed in twenty-four hours. At this time thrombocytosis had not yet developed, so that there was an actual decrease in the number of platelets present. Thrombocytosis then developed quickly. Its significance is lessened, as it was not an isolated effect. It seems probable that the secondary thrombocytosis that sometimes developed was due to the low grade dermatitis. This was slow in healing and was probably the cause of the maintenance of the thrombocytosis.

EFFECT OF COAL TAR

There was no consistent alteration of the leucocyte counts beyond the normal variation. The erythrocyte counts, also were not affected.

Thrombocytosis developed in two animals. This occurred on the third day in one animal and on the fifth day in the other. One of these rabbits then presented thrombopenia, which lasted about two weeks. Both of the other animals showed thrombopenia beginning on the third and sixth days and persisting in both for about two weeks. These did not have a rise in temperature. There was a slight loss in weight. The tar dried in twenty-four hours and began to peel off in a week. The hair returned.

GENERAL COMMENT

It has been shown that ultraviolet light has a rather specific effect in increasing the number of blood platelets in the circulating blood. The action has been ascribed by Wannfelt to the release of some chemical substance in the skin which has the ability to excite the bone marrow to produce thrombocytosis.

SUMMARY

The similarity between the effects on the platelet level of ultraviolet light and of other substances producing dermatitis suggests that the effects may be due to tissue injury and to the absorption of break-down products that stimulate the formation of platelets.

Intestinal Tuberculosis. J. J. DuMortier in the Yale Jour. Biol. & Med. 3:3:241, January, 1931.

By far the most favorable method of treatment is in the use of ultraviolet light. The results, controlled both by clinical observations and by roentgenographic examination, can only be described as remarkable. The credit for this therapy belongs to Brown, Sampson and Mayer of Saranac Lake.

The various symptoms of intestinal tuberculosis frequently disappear within two or three months, and in certain cases the roentgenographic signs of irritable bowel which were obvious at the first examination disappeared and the bowel ulcers appeared to be healed. Pathologic confirmation of the fact of healing under treatment by the quartz lamp was shortly afforded by the work of Gardner. The technic commonly employed is empirical at present. The most favorable dosage is not known, although Brown feels that too much ultraviolet is much better than too little. The type of lamp used is apparently of no moment, although precautions must be taken to guard against a painful conjunctivitis and the development of severe burns.

It is customary to begin treatments with small doses of light, gradually increasing them to a maximum. On the first day, with the lamp 36 inches from the skin, the legs are exposed for three minutes; on the second day the abdomen is exposed for three minutes, and on the third day, the back is exposed for the same length of time with the lamp at the same distance. The dosage is gradually increased until the patient is being exposed for one hour. The lamp is then placed 10 inches from the patient's body and small dosages are started again, being increased until an hour's exposure at this distance is given. At Trudeau this treatment is given once or twice a week and continued over many months.

Mal-Union of Radius Treated by Diathermy. L. D. Bailey, M.C., in Proc. Royal Soc. Med., xxiv:3:275, January, 1931.

Motor School accident Sept. 4, 1930. Skiagram Sept. 5. Showing fracture of middle of shaft of radium. Treatment by splints only until Sept. 25, then sent to physiotherapy department, St. Gerorge's Hospital. Practically no union present at this date. Treated by general massage on lower splint until Oct. 7. Condition not markedly improved. Skiagram Oct. 8. Considerable overlap of fragments. Some visible callous. Diathermy treatment began Oct. 9, and all other treatment was omitted from that day.

Four treatments given as follows:

Oct. 10—0.9 ampere for 10 minutes, through site of fracture;
Oct. 14—1 ampere for 15 minutes;
Oct. 17—1 ampere for 20 minutes;
Oct. 21—1 ampere for 20 minutes.
Skiagram Oct. 23—Considerable more callous.

Two more diathermy treatments were given, after which the course was discontinued as, clinically, the bone seemed to be firmly united.

Ultra-violet Light, X-rays and Radium as Therapeutic Agents. P. MacCarvill in The Irish J. M. Sc., 6th Series, No. 62, February, 1931, p. 51.

It is claimed for sunlight that it cures all diseases from A to Z, i. e., Acne to Zoster. Experienced dermatologists make no such claims. In the treatment of lupus vulgaris it is of immense benefit. Many cases clear up without using the water cooled lamps for local treatment. The percentage of cures has increased from 60 per cent by the old local Finsen light method to 90 per cent by the combination of general and local treatment. It often happens that the lupus is too much inflamed to allow the light to fall upon it, yet it improves when the body is irradiated and the actual lupus patch covered. This action takes place through raising the patient's tuberculo-opsonic index and not from any local effects.

Generally speaking, it is useful in raising the patient's resistance to staphylococcal infections such as furunculosis and sycosis barbae. In ringworm it is quite useless, and its employment in scalp ringworm can only be described as foolish. The parasite is in the hair. The parasiticidal rays employed locally could not affect it unless one used a blistering dose, thereby bringing out the hairs in the inflammatory process. If mothers will consent, there are simpler methods of producing blisters which require no elaborate apparatus. In ringworm of the scalp it is valuable for diagnostic purposes. By using a special filter which allows through ultra-violet rays of certain wavelengths only, the ringworm parasite fluoresces in the affected hair. The appearance is quite striking and there are no fallacies. In psoriasis the light is disappointing. The prognosis in regard to recurrences is no better than with any other remedy. In the so-called eczemas it has a very limited field, and is sometimes very harmful. In acne it is also disappointing. In diseases such as lupus erythmatosus I consider it dangerous. Even in the chronic fixed cases it may result in lighting up an actively spreading disease. If used at all, I think the patches should be protected, and general irradiation given to unaffected parts. I have seen it stated that it is an infallible cure for baldness if only the patient will persevere and continue long enough. That leads me to the conclusion that if life were not so short there would be no baldness. Undoubtedly in some cases of recent baldness it is effective. In alopecia areata we can sometimes succeed with it when other remedies fail, but alopecia areata is a rather capricious disease, and he will be wise who will not claim any remedy as infallible when dealing with it. Ulcers are much better treated by small stimulating doses of x-rays.

In surgical tuberculosis the results are sometimes brilliant. Tuberculous lesions of bones, joints, glands, and peritoneum clear up in a remarkable manner. It is obvious that the action of the rays in these cases is not local since they do not penetrate at all to the seat of the disease. In tuberculosis of the lungs the treatment is very dangerous. It sometimes lights up an old healing patch into an actively spreading one.

Rickets and its attendant conditions, spasmophilia and tetany, are markedly improved.

It is here impossible to go into details of the many diseases in which ultraviolet light is advocated. I have said sufficient to indicate that like most other reputable remedies it has a field of usefulness—a usefulness that is valuable. To recommend it for everything is to reduce it to the level of a quack remedy and bring it into disrepute.

The question of vitaglass is one to which I feel I should refer. Ordinary glass cuts off all but a negligible quantity of ultraviolet light. The glass known as vitaglass permits a considerable quantity of it to pass. You are therefore urged to put it in your city offices, in your hospitals, in the factories, in fact, everywhere that humanity is gathered in glass lighted rooms. You are shown vitaglass in a factory or warehouse and the source of the ultraviolet light with which it is demonstrated is an artificial one. There is no question but the glass allows the ultraviolet light to come through in these circumstances. But examine it under working conditions. In the first place, dust and soot particles combined with smoke pall cut off the ultraviolet rays from our cities. It is not claimed for vitaglass that it attracts ultraviolet light, or that it can draw it through this pall. Where then is the use of installing vitaglass to admit rays which are not present? Even suppose they were, we have already pointed out that a thin smear of vaseline is not penetrated by them. We know that if in our clinic the quartz burner of a mercury vapor lamp gets soiled, the ultraviolet light is cut off. Then how are windows glassed with vitaglass to be kept sufficiently clean to allow ultraviolet light to pass? For city purposes vitaglass is quite useless and does not warrant a single penny of expenditure. If the day is good and there is any ultraviolet light reaching the earth, open the ordinary window and let it in. When out for lunch spend the extra ten minutes in the street and you will get more ultraviolet rays than you would get in twenty-four hours behind vitaglass.

Tuberculosis of the Larynx. By B. B. Parish, M. D., Eye, Ear, Nose, and Throat Specialist, U. S. Veterans'

Hospital, Fort Lyon, Colo., in the U. S. Veterans' Bureau Medical Bulletin, 7:3:235, March, 1931.

Textbooks and the present-day literature give many forms of treatment for laryngeal tuberculosis: none are specific. Some physicians get good results with one procedure, while others do equally as well with another.

(1) The first essential in the successful treatment of any case of laryngeal tuberculosis is absolute voice rest as well as bed rest and general sanatorium care. Every patient with laryngeal involvement should be taught to carry a scratch pad and pencil at all times, and instructed not to speak, even in a whisper, but to write all communications. The writer has never seen a patient who religiously stuck to absolute voice rest for as long as three to six months that did not show marked improvement in his laryngeal condition.

(2) The use of the electric cautery is considered second only to absolute voice rest in advanced ulcerative cases. The indirect method of its use is as follows: Cocainize the larynx, using a 4 per cent cocain solution on a cotton carrier, and insert the curved laryngeal cauthery, controlled by a foot switch, cauterizing all ulcerative lesions. This usually gives complete relief for from two to three weeks, at which time it can be repeated, but not oftener than two weeks. The procedure is painless when properly done.

(3) Where climate conditions are favorable, natural heliotherapy gives as much relief and effects as many cures as any treatment introduced to date. It has been given an extensive trial at this hospital for the past two years and has worked wonderfully well in a majority of cases. The treatment is carried out as follows: Using the Verba laryngoscopic mirror, there is given, the first day, a half-minute exposure, which is increased a half minute daily up to 15 minutes. The increase is tolerated by most patients; however, the duration of the successive treatment can be increased faster on some, and naturally some other patients require a longer time. We use the indirect method of reflected sunlight, trying to get the rays on the laryngeal lesion. Many patients have their own mirror outfit and soon become adept in its use, but we allow its use only under direct supervision.

If eating semisolid foods causes pain and violent cough, these may be sucked through a glass tube with the head hanging over the edge of the bed, thus preventing food from entering the larynx. Spraying the larynx with a 2 to 4 per cent cocain solution 10 minutes before meals offers relief. Insufflations of powdered orthoform are also effective. Finally, it may be emphasized that if a cure for laryngeal tuberculosis is to be obtained, it will be secured only by the employment of all known means of treatment for both the general tuberculosis and its complications.

Burns and Their Treatment. By H. Jerry Lavender, M.D., Cincinnati, Ohio, in The Journal of Medicine, XI:12:635, February, 1931 (Read at a meeting of The Academy of Medicine, Cincinnati, November 3, 1930).

Antitetanic serum should be given, but morphine used very sparingly.

It is much easier to prevent the blood from becoming concentrated than to try to restore concentrated blood to normal. For an adult, at least four and, if possible, five to six liters of fluids should be given within each twenty-four hour period. The intravenous method should be the main avenue of approach, but should be closely supplemented by hypodermoclysis, proctoclysis, and, when possible, fluids by mouth.

The Fixtation method has without doubt the most followers. The principle underlying it consists of promoting healing under a crust and for this purpose drugs which have not only an antiseptic but a fixing or desiccating effect must be employed.

Tannic acid is used either in a spray, or by application of gauze or linen saturated with the drug, and is applied directly to the burned areas. The skin is first cleansed as much as possible. The blisters should be opened and the dead covering carefully removed. A two and one half per cent aqueous solution is the strength of the acid commonly employed, but as high as a ten per cent solution has been used. The acid is sprayed every half hour or hour. An atomizer is quite practical. A coagulum begins to form almost immediately, and when the two and one half per cent solution is used hourly a good leathery crust is formed in twelve to twenty-four hours in most cases. Right at the start a wire cage or tent is put in place under which several electric lamps totaling thirty to thirty-two candle power are inserted. This gives a temperature of 100 to 105 degrees F. and greatly aids in the drying and hardening of the coagulum as the spray is applied.

If sepsis does not occur the crust is left intact for ten to fourteen days, at which time the tanned membrane begins to separate by curling at the edges. Epithelization takes place very rapidly, the islands arising, in most instances, from the hair follicles. If upon removal, or in the separation of the coagulum, a so-called exuberant granulation tissue is found, then this, according to Bancroft and Rogers, is due to a low-grade infection.

When the end results show keloid formation, X-ray therapy not only reduces the keloid, but softens and loosens the tissues in and immediately surrounding it so that function may be partially or wholly restored in cases where the hypertrophied tissue interferes with proper motion.

And now as to surgical debridement. In less extensive burns of second and third degree nature involving, for example, only the face, or one extremity, or part of the chest, or abdomen, or several small areas, debridement should be the method of choice. After the emergency treatment for the primary shock, and an early institution of fluids, a light anaesthetic or gas-oxygen is usually well borne, and the complete removal of all dead tissues should be accomplished in as short a time as is consistent with thorough work. This may then be followed with a tannic acid or what is still better in these particular cases, follow the debridement with continuous wet dressings of boric acid and the daily use of ultra-violet radiations.

The amount of ultra-violet per treatment should never be more than one-half the erythema dose, and it is best to begin with one-quarter doses. There is very little discomfort in this method, as the dressings, if kept wet, are easily removed, and the ultra-violet lamps are portable. Another advantage is that sepsis can be more easily controlled, or if present, can be readily detected and treatment instituted without the necessity of first removing a hard membrane or crust. With the debridement-ultra-violet combination, islands of epithelization begin to appear in three to five days, and if necessary, skin grafting can be started very early. The writer recommends the mercury-quartz burners as he feels that they are much more efficient for this type of work.

Short Static Contractions as a Method of Corrective Exercise. By James H. McCurdy, M.D., Medical Director, Director of Graduate Division, International Y. M. C. A. College, Springfield, Mass., in Archives of Physical Therapy, X-ray, Radium, XII:2:75, February, 1931. (Read at the Ninth Annual Meeting of the

American Congress of Physical Therapy, St. Louis, Mo., September 10, 1930.)

I. THE ORDINARY METHOD.

Swedish gymnastics has been the common method used. This method has taught successfully good posture.

II. THE NEW METHOD OF SHORT STATIC CONTRACTION.

Short static contraction may be defined as the holding with increases of body weight of muscles in the short contracted position. Illustrations of the method are placing increased work upon the posterior neck muscles in the contracted position, increased dosage on the shoulder retractors with the elbows at shoulder level and the arms crowded backward, or placing increased resistance on the thigh flexors in the flexed position. This method differs from the traditional method in six particulars.

1. All exercise is given in the short static position.
2. Dosage is increased through body weight instead of joint resistance dosage increase with ability.
3. Exercises placed on a stunt basis serve as a better method of motivation.
4. Correct mechanical position is secured before the exercise begins.
5. Exercise may be taken individually with the physician as assistant or in groups of ten to thirty pupils with half the pupils acting aids alternately. The first method is adapted to office work, the last to school procedure.
6. The dosage in exercise may be progressively increased by increasing the body weight placed on the muscle group involved.

The Clinical Application of Artificial Heliotherapy. Henry Stuart Willis and Jacob Cohen, in Am. Rev. Tuberc., xxiii:3:286, March, 1931. (From the Kenneth Dows Fund for the Study of Tuberculosis, Johns Hopkins Hospital and University, Baltimore, Maryland.)

After the first year we planned to turn the light clinic into an experimental station by providing control patients who should be comparable to the treated group in every way but for deprivation of the short ultraviolet waves, —waves ordinarily used in artificial heliotherapy. This we did by interposing a screen of plate glass just under one of the burners. Alternating patients irrespective of race, sex or diagnosis, were placed under this dummy light. (We should use the word "dummy" with reservation in this connection.) Plate glass screens out the shorter ultraviolet waves in the zone which is specific for rickets, but, as we shall comment upon more in detail later, it transmits long ultraviolet rays and visible rays, the therapeutic effect of which we know nothing. There are a few observations and criteria that are germane to this study which should be considered briefly. In the first place, all conditions, save for the interposition of the screen, were maintained as nearly as could be in the two groups of cases. The two lights were kept in the same room and were separated by heavy draw curtains; the same nurse took care of both groups of patients and she herself did not know anything about the experiment except that one lamp had a special screen; the initial exposure and the rate of increase were given to all patients and the same length of exposure for the front and for the back. The possible psychic effect of the treatment was borne in mind.

Second, dosage of ultraviolet light is a matter of much more importance than it is generally thought to be. All too often a series of lamps which are procured and put to work are presumed to have the same capacity. This, however, is not always the case. But the rate of deterioration of the lamps may vary tremendously, as Dr. Janet Clark has found in the lamps under her observation. Indeed, our last two burners were new (and presumably standard) and comparable in October, 1929. But by February, 1930, one lamp emitted three times as many short ultraviolet rays as the other, although both of them had burned approximately the same number of hours.

In the third place, the degree of exposure is significant. Our routine has been to begin rather arbitrarily with small exposures, which were gradually increased. In the beginning of the treatment, the patient was 36 inches from the lamp and the duration of his exposure was two (sometimes three and four) minutes front and back. All exposures were general.

Fourth, the source of light was the mercury vapor quartz lamps.

Criteria of improvement or unimprovement must contemplate both subjective and objective deviation from the former state; must include (1) the patient's sense of illness or well being, the fact of development or loss of anorexia, loss or increase in weight, change in the general appearance of the patient, and (2) locally, increase or decrease in area of disease (for instance, size, appearance of fluctuation, suppuration or cyanosed tract in lymph nodes), appearance or disappearance of tenderness, fluid, etc., (for instance, in the abdomen), change in amount or character of discharge from operative sites, the healing or non-healing of granulating areas, gain or loss in arthritic function and change in tenderness or the degree of pain in such diseases. It was on the basis of such criteria as these that the patients were finally classified as "improved" or "unimproved."

The percentage of "improved" in the treated cases was 54 and that of the control cases was 56, which means that the two groups of patients fared equally well.

It must be remembered, however, that the control cases received the long ultraviolet rays and visible rays. And, before we can be certain of the effect of such rays the latter should be separately screened out. Results in the group of adenitis cases are on the whole a little better than those for the total number treated.

Certain individuals in this group showed such strikingly beneficial results as to properly rule out coincidence, and we have the feeling that, in a certain number of cases of tuberculous adenitis, ultraviolet light very frequently is of material benefit. It must be said, however, that there are many cases of this type of disease which do not yield at all to this therapy.

One may on rational grounds take the position that pigment probably has nothing to do, certainly in a favorable way, with the effect of the light on the body. One may hold that pigment develops in the skin as a result of irritation, such as may be caused by sunshine, heat and kindred irritants.

It is interesting in this connection that recently Woringer and Sala have exposed one arm of patients to ultraviolet light until pigmentation was established. Then they have tested this and the normal arm with tuberculin and found much less reaction in the pigmented than in the normal arm. Conversely, they have found much more intense "takes" in the pigmented arm when they applied vaccine virus to both arms. At the instance of Dr. L. N. Gay in the protein clinic, we produced pigmentation on the right arm of ten people. These he tested on both arms simultaneously with several different pollen extracts and found no difference whatever in the response.

There is one feature of the study which should come in for special mention, for it has been conspicuous throughout the work. It is the general sense of well being which many patients, even many without improve-

ment in the local condition, experience after beginning light treatment. It happened that a very large majority of our patients became enthusiastic over the therapy for this reason. Many of them felt better and ate better and gained weight. One patient, a colored man of twenty-one, with multiple tuberculous lesions of the bones and skin, gained twenty-two pounds in nine months and underwent considerable improvement. He was then placed under the screen lamp, when his sense of well being became much less noticeable. He lost his appetite and some weight. Another patient, a white woman with a very small tuberculous cervical lymph node, showed the same reaction in a marked degree. She and possibly ten others requested to be put back on the other lamp although not one of them knew what was the difference between the two lamps.

Treatment of Pulmonary Tuberculosis. Ernest Cooper, M.D., South Carolina Sanatorium, State Park, S. C., in J. S. C. M. A., xxvii:2:37, February, 1931.

In applying rest and its antithesis—exercise—in the treatment of tuberculosis they must be prescribed as if drugs, according to the needs of each patient and according to the stage of his disease. In the early stages of the disease most patients are able to take sufficient exercise to keep their muscles and general bodily functions in good order without harm to themselves, but in the later stages this is not true. Tuberculosis produces certain effects through toxins, elaborated by the tubercle bacillus, and poured into the blood stream and by it carried throughout the body, affecting the nervous system, and every important bodily function. The respiratory, circulatory and digestive systems are all disturbed; the muscular system loses tone and the heat regulating system is rendered unstable.

In prescribing exercise or rest we must consider the condition of the patient's heart, his ability to exercise without fatigue, or dyspnea; the effect upon cough, temperature, sputum, hemoptysis and weight. Exercise should be assigned so as to have no untoward effect upon the patient in these respects.

Exercise, without complications arising, is beneficial. It strengthens the muscles, quickens the flow of blood and lymph, improves nutrition and indirectly favorably influences bodily functions. If exercise is carried to the point of fatigue or strain harm is done, the vital forces are depressed, the patient's resistance is lowered, and energy that should be used in combating disease is required to overcome fatigue.

Exercise may cause shortness of breath. If it is of cardiac origin and the heart is not seriously diseased and other complications are not present, graduated exercises, adapted carefully to the powers of the heart may improve its tone and strengthen its force, thus removing the dyspnea. If the respiratory embarrassment be of pulmonary origin, due to lack of lung tissue, exercise must be carefully restricted for exertion demands more oxygen and so increases the shortness of breath.

The heart requires careful consideration in prescribing exercise.

Violent coughing means deep inspirations, great increase of intrapulmonary pressure and consequent stretching of the air vesicles, just what happens in deep breathing exercises. There is evidence that hard coughing is a factor in disseminating infection through the lungs, causing it to spread to healthy tissue and other organs. The impulse to cough should be repressed if possible.

All febrile patients should be given complete bed rest for two weeks or longer after their temperature becomes normal.

The tuberculous would have better chances of recovery if they ate less. A heavy and excessive diet throws a strain upon the organs of digestion and excretion.

Intestinal pains not infrequently respond to violet rays, to sunshine, and at times to 5 c. c. of 10 per cent solution of calcium chloride intravenously, and more recently cod liver oil one half ounce floated upon three ounces of cold tomato juice has been advocated.

Spondylitis Deformans. Samuel Kleinberg, M.D., New York, in Arch. Surg., 22:3:485, March, 1931.

The treatment is general and local. The general treatment is directed toward removing or remedying whatever etiologic factor or focus of infection is discovered, toward improving the health of the patient and toward relieving him of pain. So far as focal infection is concerned, it has been my experience that one can rarely discover a source of infection that may with certainty be considered the real cause of the spinal disease.

The local treatment is directed to the back and has practically no relation to the cause of the disease. The local treatment of spondylitis deformans is concerned first, with the correction of the deformity, secondly, the mobilization of the spine whenever possible, and thirdly, the relief of backache. When the condition of the patient has progressed to the stage of complete bony ankylosis of the vertebrae, the deformity and disability are permanent and irremediable. However, during the earlier stages, and for a long time before the ankylosis is complete and absolute, there is ample opportunity to apply treatment effectively. Though the patient may present what appears to be clinically complete rigidity and fixation of the entire spine, if the x-ray picture shows no bony ankylosis or complete fusion of only some of the vertebrae or partial fusion of several small spinal segments, this phase of spondylitis deformans has interested me especially, and I shall discuss at length the local treatment which has proved of great value.

The essential element in the treatment is continuous rest in the supine position, first on a straight frame and later on a convex frame. In this attitude the muscles relax, the discomfort disappears, and the spine gradually adapts itself to the curve of the frame. The treatment is slow and prolonged. Both patient and surgeon must be prepared to spend from two to six months in attaining their object. The treatment can best be carried out in a hospital equipped with a brace shop for the manufacture of the frame and for the frequent changes in its angulations. The treatment is most conveniently carried out in an orthopedic institution, where everybody concerned is accustomed to chronic cases and the care of this type of patient, who needs much patient nursing.

The frame is rectangular, made of gaspipe and covered with tightly stretched canvas. It is the ordinary convex frame used for scoliosis, round shoulders and Pott's disease, except that it is several inches wider than the distance between the patient's shoulders, so that his arms may rest comfortably on the canvas. Twenty inches is an average width. The length of the frame is sufficient to allow it to extend about four inches above the patient's head and at least as much below his feet. The frame may rest on the mattress or be suspended from the head and foot pieces of the bed.

Usually the patient cannot be placed on the frame immediately, because the spine is so stiff that it cannot adapt itself to the position of extension. Consequently, he is first placed in bed and urged to stay on his back as nearly continuously as possible. Several times a day

he turns on one side or the other for relief from the supine position. After a few days he is placed on a frame that has a gentle curve of approximately 5 degrees. Several days later the curve of the frame is increased by 5 or 10 degrees, and every four or five days thereafter the angle of the frame is slightly increased. The change in the curve of the frame depends on the tolerance of the patient and his ability to arch his back in conformity to the convexity of the frame.

During the period of active treatment on the frame, the back receives baking and massage. The patient is also encouraged to exercise his limbs and his back. Several times a day he changes to the supine position, places his hands behind his back and forcibly arches his back until he can look up at the ceiling. It is surprising how much the patient can accomplish by persistent effort. The extension and ultimate hyper-extension of the spine can be materially increased by judicious daily passive movement or stretching of the spine. This procedure should not be left to a masseur, who in his desire to bring improvement may use too much force and set up a painful irritation of the spine which will retard the improvement. The surgeon in charge should stretch the patient's back. He knows what he seeks to obtain by treatment, he has studied and understands the patient, and is in a position to appreciate best the degree of force and the duration of the treatment that may be safely employed to effect a correction of the deformity. When the spine can be arched backward voluntarily to a normal or nearly normal angle, one begins to move the spine laterally and in a rotatory direction. One aims for a complete correction of the deformity.

When a cure or the maximum improvement has been obtained, the patient is left on the frame several weeks longer to assure the permanency of the result. In the meantime he is measured for a Taylor spinal brace. This is preferred to other spinal supports, because it fixes the shoulder and pelvic girdles while exerting corrective pressure on the dorsal area. When the brace has been applied the patient is allowed to sit up or stand for brief periods. Gradually the period out of bed is extended until the patient is able to be about for several hours a day. The local treatment to the back should be kept up for many months.

During the greater part of the day the patient lies on the convex frame. When out of bed he wears the spinal brace. He must continue with massage, stretching of the back and corrective exercises. The surgeon cannot relax his efforts until there is definite evidence over a period of many months that there is no tendency to relapse of the deformity.

Treatment of Hypertension. James P. O'Hare, M.D., Assist. Professor of Medicine Harvard Medical School, in New England J. M., 204:12:602, March 19, 1931.

Rest, physical and mental; reduction of activity. Rest is important in keeping up general body and cardio-vascular tone. Walking is the very best of all. Golf, when played easily, is also a help. If the patient is unable to walk sufficiently, massage is in order. Dietetic restriction is of value in reducing the weight of the obese patient. Innumerable drugs have been tried. Most of these I have found to be of very little value.

Other measures occasionally employed in treatment of hypertension are: bleeding, where cerebral hemorrhage or a cardiac break threatens; lumbar puncture for severe headache; a prolonged warm bath; the removal of irritating foci of infection, etc.

Finally, we should realize that the tactful regulation of the patient's activities, together with reassurance and encouragement, are the most important therapeutic weapons we possess. No treatment is justified which makes the patient a neurotic whose entire existence centers around his blood pressure.

The Role of Hydrology in Preventive Medicine. F. G. Thomson, M. D., in Proc. Royal Soc. Med., xxiv:3:263, January 1931.

Obesity.—The onset of obesity is not always to be explained in terms of food and exercise. Many men and women tend to put on weight at middle age, not owing to any notable change in habits, not because of any sudden excess of gluttony or disinclination for exercise, but because for some reason or other, their sympathetic endocrines have become relatively inefficient. Among the causes of sympathetic exhaustion, chronic infection —intestinal or otherwise—must always be seriously considered. The fact that obesity frequently follows acute long-continued toxemia, such as enteric fever, has long been recognized, and it is probable that in many other cases chronic infection, though often unsuspected plays a more important part than is usually recognized.

The main indications, in addition to regulation of diet and removal of intestinal toxemia by suitable waters or drugs, are first to promote the katabolism of fat by hot immersion baths, or radiant heat, and second, to promote the endocrine activity by the stimulating action of massage douches, needle baths, alternating spinal douches, etc., on the skin. As obesity is more often the expression of debility than of super-abundant health, it is important to regulate the treatment in such a way that no further disability ensues.

Gout.—That gout is the result of disordered metabolism of nucleins whereby an undue proportion of purin bodies, instead of being excreted in the form of soluble urea remains in the body as uric acid, and is eventually precipitated in the form of gout deposits, everyone will agree.

Now all clinical evidence goes to show a close connection between gout and intestinal disorders. The association of gout with habitual good living, lack of exercise, and portal congestion is too obvious to require elaboration, and frequency with which an attack is immediately preceded by symptoms of dyspepsia is equally well known.

Removal of intestinal toxins, stimulation of digestion and relief of portal congestion by suitable waters, cautioua stimulation of metabolic activity by warm immersion baths, hot douches, etc., and the promotion of more efficient elimination by the skin and kidneys combine to form ideal methods of rectifying antecedents of gout.

Glycosuria.—The claim that treatment by aseptic baths or medicinal waters, or both combined, may have any appreciable effect in preventing glycosuria or diabetes, may at first sight appear somewhat extravagant.

The exercise necessary to take up this sugar is not taken. Beyond an occasional or weekly round of golf his exercise is probably limited to pacing up and down the office carpet, evolving plans for successful commerce. Pancreatic efficiency on the other hand, leads to diminution. Abnormal sympathetic activity tends in itself to inhibit the action of the pancreas and the latter is further embarrassed by lack of exercise and portal congestion. Thus we have a purely functional disturbance of balance, excess of sugar liberated from the store on the one hand, and on the other a deficiency of natural insulation to deal with it. Such a condition is obviously one that lends itself to a course of hydrological treatment. Rest from agitation and excitement, and removal of portal congestion by salines, laxatives or other waters, and improvement in general circulation and mus-

cular efficiency by baths, massage, and regular exercises, all combine to remove the various functional deficiencies involved.

Hyperpiesis.—All recent work on the capillaries goes to show that so far from being merely passive conductors of blood driven into them through the arterial tree, the capillaries are themselves capable of wide active variations of calibre. Under ordinary circumstances only a small proportion of capillaries is patent at any one time. Thus it has been shown that in a tetanized muscle the number of capillaries visible may be anything from forty to fifty times as many as when the muscle is at rest. Furthermore, in poisoning by histamine and in surgical shock resulting from excessive lacerations of the muscles, the paralyzed capillaries may distend until they hold practically all the blood in the body. In view of all these facts I think it is not unreasonable to assume that the capillaries play a much more important role in determining the blood ressure than is usually recognized, and that their functional disuse and ultimate wasting may be primary aetiological factors. Also that the good results from hydrological treatment in the earlier stages are due to restoring the patency of capillaries more than to causing temporary dilatation of the smaller arteries and veins.

Raynaud's Disease—Recent Experimental Studies. By William J. Kerr, M. D., San Francisco (from the Department of Med., Univ. of Calif. Med. School, San Francisco, work carried on in collaboration with Sir Thomas Lewis at the Univ. College Hosp. Med. School, London, while on sabbatical leave from the Univ. of Calif.), in California and Western Med., xxxiv:2:91, February, 1931.

In the normal individual an exposure to temperatures of from 0 to 10 degrees for several minutes results in a reaction which increases the circulation of the cooled part, and a consequent elevation of the temperature above that of the uncooled areas. This appears to be a normal biological protective mechanism. In the milder cases, without loss of tissue, the mechanism is but slightly altered, but in the advanced cases, with local necrosis, there is little or no reaction to over-cooling. The color may become red, but the temperature of the skin follows closely the room temperature. The normal reaction persists for an hour or more, with the part at rest, but may be more prolonged if the individual is actively moving about. In one or more severe cases the circulation in one hand seemed improved over its fellow during repeated exposure, and persisted after the treatment was stopped.

In them exposure of one hand to temperatures between 4 and 10 degrees would keep this hand red and warm and free from attacks, whereas the untreated control hand would show repeated attacks. It would seem advisable to avoid pain if the patient is to cooperate in treatment. The treatments should probably be given two or three times a day. They may at first be given and followed by gently warming the part in water or by placing the hand against a warm part of the body. Showers or tub baths with water at gradually lower temperatures may also be instituted.

Suggested Plan of Treatment—First Week.—One hand or foot, preferably the one more seriously affected (companion as control), immersed in water at 10 degrees centigrade three times a day for ten minutes. Severe pain or faintness to shorten period of exposure, or time for reducing temperature.

Second Week.—Temperature reduced to eight degrees.

Third Week—Temperature reduced to six degrees.

Fourth Week.—Temperature reduced to five degrees.

Fifth Week and Thereafter.—Temperature reduced to four degrees.

When quite certain that beneficial results are being obtained, shower or tub baths of decreasing temperatures may be instituted. If possible, treatments should be started before cold weather begins. The effects of the reeducation of the reaction to cooling may be studied by following the surface temperatures, with the thermocouple under control conditions. Contrast baths may be used at first if desired.

Results of treatment in patients with Raynaud's disease, scleroderma and hypertrophic arthritis suggest that the principles outlined above may have a wide application. This method may also be used in the treatment of chilblains. The value of the empirical use of cold baths in the prevention of the common cold may well be due to the stimulation of this reaction as a protective mechanism against cold. The common cold may be found to be primarily a failure of this mechanism. Studies with this possibility in mind are being undertaken.

Summary.—A variety of Raynaud's disease has been studied. It is the form in which the digits become periodically pale or cyanotic, and in which, after several or many winters of repeated attacks, terminal portions of the digits may be lost by a process of slow, dry gangrene.

The circumstances in which attacks appear and disappear have been carefully observed. In mild cases there is but slight variation from the normal; but in severe cases the fingers slavishly follow the environmental temperature. These fingers do not react to overcooling as readily as do normal fingers, and are the ones which develop local gangrene.

The immediate cause of the defective circulation is spasm of the digital arteries. These vessels in the milder cases are capable of full expansion, and nearly so in the severe cases.

Local applications of heat and cold show that the spasm is profoundly influenced by temperature, in response to which the vessels behave abnormally. These observations are contrary to what would be expected if the current views ascribing the spasm to vasomotor influences were true; the abnormal element in the reaction to cold is a direct reaction, and is due to a peculiar condition of the vessel wall locally; it is not the result of a reflex action through the vasomotor nerves. The state of vasomotor nerves naturally influences the tone of the vessels in these patients, as it does in normal people; but the pathological element in the vascular spasm is not of central nervous origin, as at present it is generally thought to be. The effects of interfering with the nerves to the affected parts, by local anesthesia or by surgical division, are briefly discussed.

The Present Status of the Treatment of Pneumonia. R. H. McDonald, M. D., Cleveland, in Ohio S. M. J., xxvii:3:223, March, 1931.

SERUM THERAPY

Serum therapy is designed to provide a temporary passive immunity in the patient. It is not antitoxic but rather provides the patient with a supply of antibodies —agglutinins, opsonins, precipitins, and substances which aid the process of phagocytosis. Such antibodies are found naturally in the blood of pneumonic patients particularly at the crisis when ordinarily the blood stream becomes sterile. The use of serum helps to bring about, apparently, the conditions obtaining at the crisis.

Cecil's series of cases at Bellevue and Harlem hospitals constitutes by far the largest clinical investigation

of the value of serum therapy. Cecil regards it as of definite therapeutic value especially in cases of pneumonia due to type I. Practically all the patients in this classification who were treated within the first two days recovered, the early use of the serum being a very definite factor in its efficacy. The results in cases due to type II were less striking and in other groups of cases only such benefits as may come from the injection of some foreign protein, resulted. In cases due to types III and IV little benefit was noted. The clinical improvement in all these cases was shown by a drop in temperature, reduced respiration and cardiac rates, and a general amelioration of symptoms. Apparently the onset of the crisis was hastened although it is difficult to be sure of this since the crisis may occur at variable periods in the progress of the disease in different individuals.

VACCINE THERAPY

The question of the efficacy of vaccine therapy recurs frequently. Theoretically it is a little difficult to understand in what way the injections of dead organisms into the blood stream can influence the defensive mechanism of the body when we know that at least sixty per cent of the patients suffering from pneumonia have a bacteremia. However, reliable clinicians, among them Alexander Lambert of New York, believe that the administration of vaccine reduces markedly the severity of the disease and lessens the mortality. He uses a mixed stock vaccine and gives ½ c. c. intramuscularly, every six hours as long as the temperature is above 99 degrees F., and when the temperature falls to 99 degrees or below he gives one to two doses every twelve hours, then one to two doses every twenty-four hours.

QUININE

Although optochin has been used extensively, especially in Germany in dosage of 0.3 gms. five times daily, its use is attended by a certain degree of danger of optic neuritis, and more recently according to the Cohn-Brenner method, quinine has been administered in solution consisting of quinine muriate 2 gms., urethane 1 gm., in 20 c. c. of distilled water.

POTASSIUM PERMANGANATE

In recent years the use of potassium permanganate in solution has come into vogue in some centers. The solution used is made of two grains of potassium permanganate in 750 c. c. of water. From four to six ounces of such a solution is given per rectum, one-half hour after a cleansing enema has been given, and the dose is repeated every two to six hours. The solution must be freshly prepared every twelve hours and given slowly and carefully. Certain observers,—Oerting in this country and Knott in England—report striking results from this method in lessened cough and cyanosis, reduction of restlessness and promotion of sleep. The mechanism of the effects of this method seems somewhat obscure.

NUCLEINIC ACID

Another interesting therapeutic venture has been the use of nucleinic acid in five per cent solution, the object being to stimulate leucocytosis.

OXYGEN THERAPY

The most important symptomatic therapy in any type of pneumonia is the use of oxygen.

The oxygen tent as described by Barach consists of an inverted V-shaped simple pitched-roof tent suspended above the bed and closed by a horizontal sheet fitting underneath the mattress. A relatively air-tight compartment is thus made, the material used being a rubberized fabric specially constructed of three-ply layers of cotton cemented by rubber tissue. The tent is provided with windows and flaps through which access may be had to the patient. Ventilation is accomplished by an external closed circuit which provides an oxygen-rich atmosphere free from carbon dioxide, heat and excess moisture. Adequate air motion within the tent is assured by a small fan. Roth describes a head tent which fits about the shoulders only and is similar in principle to the bed tent.

DIATHERMY

It has not been proved that the duration of the disease has been affected by the use of diathermy although it would appear that the period of resolution is definitely shortened. Symptomatically the results have been good. In most cases increased respiratory excursions and some decrease in cyanosis are noted, and there is usually an increase in ease and quantity of expectoration. Generally there is some decrease in both systolic and diastolic blood pressures.

These results of the use of diathermy must be due to the simple presence of increased intrapulmonary heat, with its stimulating effect upon the body's natural defenses against the organism. There is probably some improvement also in the pulmonary circulation around the area of consolidation but the consolidation itself is little affected. Furthermore since the body's defense is in part undoubtedly due to the bactericidal effect of phagocytic enzymes, a process in itself stimulated by the febrile temperature developed in the disease, the improvement is further promoted by the artificial high temperature produced within the lung by the use of diathermy.

Diathermy is not a specific cure for pneumonia. It has proved of value as a helpful adjunct to treatment and as such it should be regarded.

GENERAL TREATMENT

The patient should be put to bed in a sunny, airy room. In the lobar type of pneumonia, the patients stand cold air well; in the lobular type they usually require heated air, but each type of patient should be in a well-ventilated room preferably with air in motion.

The diet should be light but nourishing. More important is the ingestion daily of about 3,000 c. c. of fluid.

The relief of pain and the procuring of rest are two of the most important principles in the treatment. For the relief of pleuritic pain, which is usually a prominent feature early in the disease, the application of mustard paste, which should be renewed every four hours, is very useful.

Careful watch should be kept for signs of right-sided cardiac failure. These signs are increasing cyanosis, weakening of the second pneumonic sound, venous stasis in the neck, edema of the bases, a fall in tension of the pulse rate and a fall in blood pressure. Digitalis should be used early in the disease in order that digitalization may occur early.

Recent opinion has questioned the value of digitalis. Cecil reports a ten per cent greater mortality in a series of cases treated with digitalis over those in which the patients received no digitalis.

Venesection may be very useful early in the disease in the case of the plethoric, obese individual with full bounding pulse, and later on in the disease, right-sided cardiac dilatation may be greatly decreased by the prompt and rapid removal of a quantity of blood. Fifteen to twenty ounces should be drawn rapidly.

Mental-Hygiene Problems of Children with Sensory-Motor Defects. By Bronson Crothers, M. D., Neurologist to Children's and Infants' Hospital, Boston (from the Department of Pediatrics, Harvard Medical School

and the Children's Hospital, Boston), read at the First International Congress of Mental Hygiene, Washington, D. C., May 9, 1930, in the New England Journal of Medicine, 204:10:481, March 5, 1931.

RELATION OF SPECIAL UNIT TO THE HOSPITAL AND TO THE COMMUNITY

The Children's Hospital is one of a group of institutions connected more or less closely with, but not controlled directly by, Harvard University.

PERSONNEL

The director is neurologist to the hospital, with responsibility for a special clinic in the out-patient department and for consultation in the wards of the other services.

A trained psychologist, with adequate experience among small children.

A psychiatric social worker.

A physiotherapist, who has devoted many years to the physical training of children with disorders of the nervous system in the out-patient department, is now devoting most of her time to the special group of children in the new unit.

We are still a bit uncertain as to the exact place that should be occupied by a teacher.

We have in mind the complicated problem of dealing with special disabilities of speech, reading, and so on, and for this purpose propose to enlist the aid of research associates from the Harvard Graduate School of Education.

Nursing service of the usual type is, of course, available.

PHYSICAL PLANT

The physical plant seems to us well adapted to its purpose. The special unit occupies two out of five floors of a fireproof building. The other floors are thoroughly equipped and staffed for physiotherapeutic work, including adequate facilities for heliotherapy and a pool where exercises can be carried on in warm water. Outside is a small playground with sufficient equipment and space to serve our purpose.

Treatment of Pneumonia. By D. Schuyler Pulford, Woodland, in California & West. Med., xxxiv:3:191, March, 1931.

Fever should be controlled, not abolished. Hydrotherapy, in the form of frequent sponges, should be used to the exclusion of antipyretics, but care should be exercised not to tire the patient by too frequent handling and turning.

Cough, pain, and restlessness should be controlled, if necessary, by drugs. Steam inhalations bearing compound tincture of benzoin and menthol and eucalyptus are useful.

It seems to be the consensus of opinion that prophylactic use of digitalis is contraindicated in pneumonia.

I believe that intravenous saline and glucose therapy should be tried before digitalis even in these cases as with the giving of from 1,000 to 3,000 cubic centimeters of normal saline or five per cent glucose in saline over a period of six to twelve hours and transfusions of 500 cubic centimeters of blood an impending "cardiac failure" is averted, indicating that perhaps we are really dealing with vasomotor failure due to paralysis of the constrictor fibers from circulating toxins and not with a failing myocardium. The patients die from "medical shock," not from circulatory failure.

Oxygen Treatment—Braasch, Binger, and Roth have done much to develop apparatus with which to give oxygen efficiently. Concentrations from 40 to 60 per cent by the tent method is most practical. Failures in the past to obtain good results with oxygen treatment have been due in most part to poor apparatus and inefficient methods.

Diathermy—In Doctor Crile's clinic, diathermy is thought to prevent postoperative pneumonias when given during operations and to be of benefit in early cases of pneumonia. It causes a preliminary rise and subsequent fall in general body temperature and the patient perspires, rests, and is often relieved of pain. It is contraindicated in edematous lungs and is reported to be more efficacious the earlier in the disease it is used.

Diathermy makes mustard plaster therapy unnecessary in the hospital. It should not be discarded by the family physician in the home, where the family as well as the patient demands consideration.

Sera—In the hands of such men as Cole, Felton, Park, and their co-workers, much has been done to develop experimentally and prove clinically the efficacy of immune serum for Type I pneumonoccus.

Early diagnosis and injections of large amounts of serum reduce the mortality rate remarkably in this type of lobar pnumonia. Vaccine therapy is still of questionable value. Although vaccine therapy by Lambert in 1926 cut the mortality in Type I pneumonia from 17 to 8 per cent, it is not generally accepted as of specific value.

The Treatment of Warts. By Earl D. Osborne, M. D. and Edwin D. Putnam, M. D., Buffalo, N. Y., in Radiology, xvi:3:340. (Read before the Radiological Society of North America at the Fifteenth Annual Meeting at Toronto, Ontario, Canada, Dec. 2-6, 1929.)

We have gradually evolved what we feel is a thoroughly satisfactory technic for the treatment of plantar warts.

Our technic for the treatment of plantar warts with X-ray is as follows:

1. The patient is placed on a high examining table, and the keratotic layer over the wart and for some distance around it is carefully pared down with a new razor blade, to a point just short of bleeding. We feel that careful attention to this factor has increased our percentage of cures at least 20 per cent.

2. After locating all of the lesions they are carefully outlined with a fine-pointed pen exactly at the periphery of the wart. Placing a sheet of thin oiled silk over the area on the foot, a careful tracing is made of the lesions. This tracing is then transferred to lead foil and the holes are cut out accurately with a sharp, fine scissors.

3. The patient is then placed on his abdomen or side, and the foot held in a stirrup which will not move, being so fastened as to give as much stability as possible to the entire leg. It is absolutely essential that the patient be under no muscular strain while the treatment is going on. The lead foil is then fitted exactly to the wart area, and fastened down by adhesive straps which go entirely around the foot. We feel that this is the most essential part of the entire process, and that the lead foil must fit exactly to the wart areas without exposing any normal tissue to the effect of the X-ray. We have found that nurses can be trained to do this work much better than doctors, and that they will take infinite pains to get the lead foil exactly in the right position. It requires time and patience on the part of the nurse, but the results justify the time. After instituting this procedure, we soon found that no reaction occurred in the normal tissue surrounding the wart, with our ordinary dosage of from 2 to 3 skin units of X-ray. We have gradually increased this dosage until we have reached 8 skin units, with absolutely no visible reaction in the normal tissue in a vast majority of cases, and only a slight erythema in those that did react.

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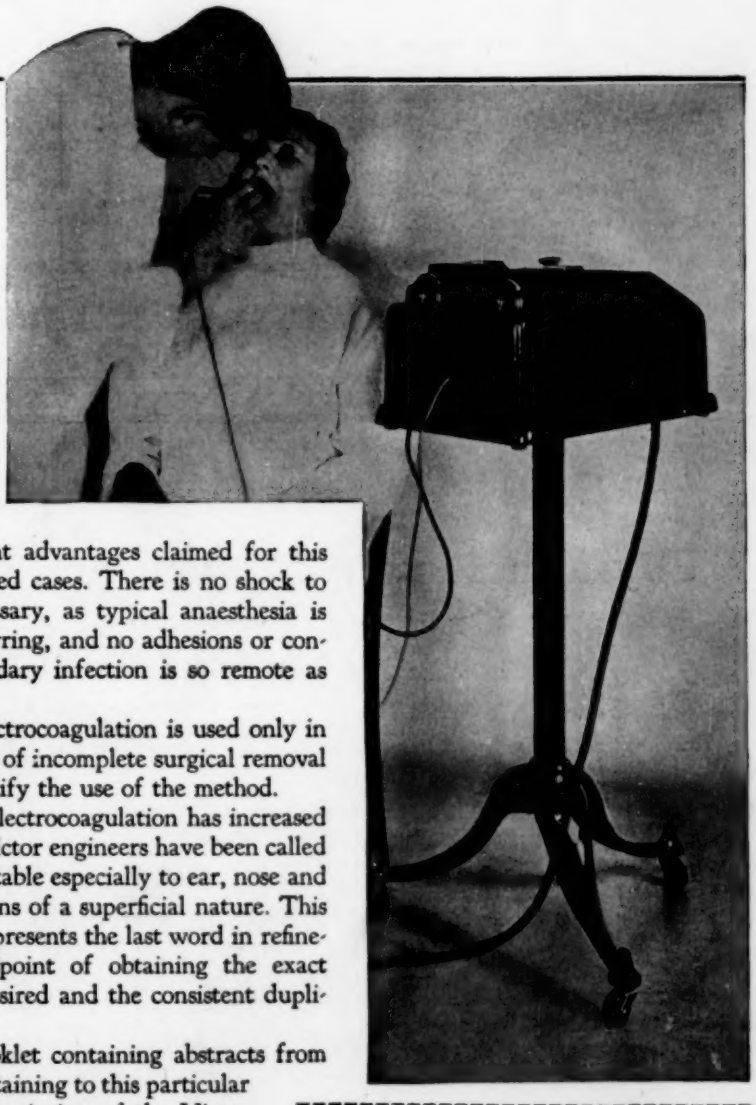
When is Electrocoagulation indicated for the removal of tonsils?



TO summarize authoritative medical literature on this subject, the use of diathermy for electrocoagulation of tonsils is being advocated for the following types of cases:

Aged patients—Haemophiliacs—Heart cases—Those who resist surgery—Kidney cases—Acute syphilitics—Tonsils with malignancy—Tubercular patients or tubercular tonsils—Lingual tonsils—Tonsil remains, or recurrent tonsil tissue.

There is a number of important advantages claimed for this method, when used in these selected cases. There is no shock to the patient. No injection is necessary, as typical anaesthesia is employed. There is little or no scarring, and no adhesions or contractions. The possibility of secondary infection is so remote as to be a negligible factor.

Many physicians feel that if electrocoagulation is used only in that type of case which is the result of incomplete surgical removal of the tonsils, this alone would justify the use of the method.

The fact is that the interest in electrocoagulation has increased in recent years to the extent that Victor engineers have been called upon to design a special unit, adaptable especially to ear, nose and throat work, and similar applications of a superficial nature. This Micro Surgical Diathermy Unit represents the last word in refinement of control, from the standpoint of obtaining the exact quantity and quality of current desired and the consistent duplication thereof.

We shall be glad to send a booklet containing abstracts from authoritative medical literature pertaining to this particular field of work, together with a description of the Victor Micro Surgical Diathermy Unit.

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Please send me abstracts from articles on electrocoagulation in ear, nose and throat work; also further particulars on the Micro Surgical Diathermy Unit.

Dr. _____

Address _____

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